Interconnect Solutions

—INTERCONNECT SOLUTIONS

The story behind Color Connect™

John Bies of Redstone Arsenal certainly did; he lobbied the establishment to adopt a “standardized method to rapidly identify high frequency coaxial connectors.”

His report included a short list of possible results from misidentifying connectors and attempting to mate two incompatible connectors, including damaged equipment, degraded equipment reliability, degraded performance, degraded mission readiness, increased maintenance time, increased maintenance actions and lost efficiency. Additionally, even if two connectors could mate, their operational frequencies might differ, as is the case with mechanically compatible 3.5mm and 2.92mm connectors where the highest common operational frequency may only be 26.5 GHz.

John went on to state that the benefits of color-coding high frequency coaxial connectors would include the elimination of damages to equipment, a greater confidence in connector identification and use, a financial saving in training time and costs (John estimated $5.8M and 5000 man-hours per year in the US military/government agencies alone), an increase in efficiency, reliability and readiness and an improvement in personnel safety.

An Institute of Electrical and Electronics Engineers (IEEE) Coaxial Connector Rapid ID Working Group was established in June 2008; a proposed color code schema was developed in August 2008; IEEE project authorization request P1802 was submitted for review in January 2009 and approved in May 2009. The working group is now referred to as IEEE P287 with mandate to review the 287-2007 standards for coaxial connectors. With no other reason than selecting a familiar color scheme known to engineers across the globe, the standard resistor color-code BBROYGBVGW was proposed for high frequency coaxial connectors (increasing resistor value compared to increasing frequency).

Maury Microwave has used color bands for over twenty years to identify 75ohm N Type connectors, and in 2012 decided to extend its offering with the launch of ColorConnect™ precision adapters, color-coded Stability™ cable assemblies, and TW-series torque wrenches.

Test Essentials™ Lab Adapters & ColorConnect™ Precision Adapters

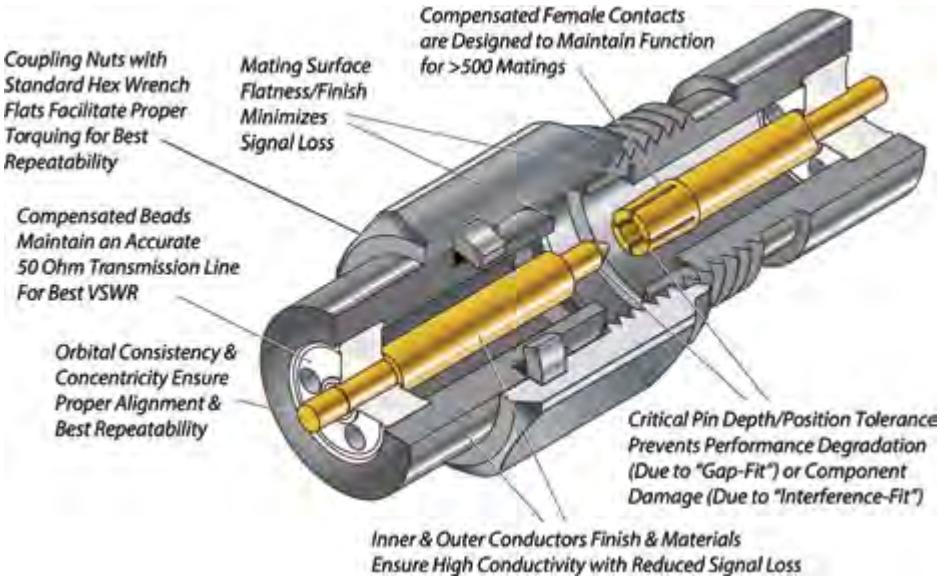
AT-A-GLANCE PERFORMANCE COMPARISON

Test Essentials™ Lab Adapters

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 ratios. Test Essentials™ Lab Adapters feature excellent electrical performance, rugged construction for durability, repeatable mating and high reliability. Test Essentials™ Lab Adapters are available in SMA, N, 3.5mm, 2.92mm, 2.4mm and 1.85mm in-series and between-series configurations.

ColorConnect™ Precision Adapters

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. ColorConnect™ Precision Adapters are available in N Type, 3.5mm, 2.92mm, 2.4mm and 1.85mm in-series and between-series.



Shop Online for Test Essentials™ Lab Adapters & ColorConnect™ Precision Adapters Online at the Maury Store: (http://www.maurymw.com/store)

Calibration-Grade (Metrology) Adapters

Maury Microwave's comprehensive line of calibration-grade (metrology) adapters (see page 19) 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. In-series and between series coaxial adapters are available for all precision laboratory measurement connectors – 1.85mm, 2.4mm, 2.92mm (K), 3.5mm, 7mm, 14mm, 7-16, etc.; all common systems connectors – type N, TNC, etc.; and several special purpose connector series such as EIA 7/8 rigid line connectors.

Proposed IEEE High-Frequency Connector/Adapter Color Convention (Available with Maury ColorConnect™ Precision Adapters)

BROWN	SMA
RED	TYPE N
ORANGE	3.5mm
YELLOW	2.92mm (K)
GREEN	2.4mm
BLUE	1.85mm (V)

Maury Coaxial Adapter Solutions

Connector 1	Connector 2	VSWR		
		Calibration-Grade (Metrology) Adapters	ColorConnect™ Precision Adapters	Test Essentials™ Lab Adapters
SMA (F)	SMA (F)	—	1.15	1.15
SMA (M)	SMA (M)	—	1.15	1.15
SMA (M)	SMA (F)	—	1.15	1.15
SMA (F)	N (F)	—	1.14	1.15
SMA (M)	N (M)	—	1.14	1.15
SMA (F)	N (M)	—	1.14	1.15
SMA (M)	N (F)	—	1.14	1.15
N (F)	N (F)	1.09	1.15	1.15
N (M)	N (M)	1.09	1.15	1.15
N (M)	N (F)	1.09	1.15	1.15
3.5mm (F)	N (F)	1.13	1.14	1.15
3.5mm (M)	N (M)	1.13	1.14	1.15
3.5mm (F)	N (M)	1.13	1.14	1.15
3.5mm (M)	N (F)	1.13	1.14	1.15
3.5mm (F)	3.5mm (F)	1.08	1.12	1.12
3.5mm (M)	3.5mm (M)	1.08	1.12	1.12
3.5mm (M)	3.5mm (F)	1.08	1.12	1.12
2.4mm (F)	3.5mm (F)	1.08	1.10	1.10
2.4mm (M)	3.5mm (M)	1.08	1.10	1.10
2.4mm (F)	3.5mm (M)	1.08	1.10	1.10
2.4mm (M)	3.5mm (F)	1.08	1.10	1.10
2.92mm (F)	2.92mm (F)	1.12	1.14	1.17
2.92mm (M)	2.92mm (M)	1.12	1.14	1.17
2.92mm (M)	2.92mm (F)	1.12	1.14	1.17
2.4mm (F)	2.92mm (F)	1.12	1.14	1.14
2.4mm (M)	2.92mm (M)	1.12	1.14	1.14
2.4mm (F)	2.92mm (M)	1.12	1.14	1.14
2.4mm (M)	2.92mm (F)	1.12	1.14	1.14
1.85mm (F)	2.92mm (F)	1.12	1.14	1.14
1.85mm (M)	2.92mm (M)	1.12	1.14	1.14
1.85mm (F)	2.92mm (M)	1.12	1.14	1.14
1.85mm (M)	2.92mm (F)	1.12	1.14	1.14
2,4mm (F)	2,4mm (F)	1.15	1.17	1.22
2.4mm (M)	2.4mm (M)	1.15	1.17	1.22
2.4mm (M)	2.4mm (F)	1.15	1.17	1.22
1.85mm (F)	1.85mm (F)	1.15	1.20	1.20
1.85mm (M)	1.85mm (M)	1.15	1.20	1.20
1.85mm (M)	1.85mm (F)	1.15	1.20	1.20

Two New Maury Coaxial Adapter Solutions

Test Essentials™ ColorConnect™ Adapters — In-Series

Test Essentials™ Lab Adapters — In-Series

Available Models

ColorConnect™ Precision Adapters				
Model	Connector 1	Connector 2	Frequency	VSWR
CC-A-SMA-FF	SMA Female	SMA Female	DC – 18.0	1.15
CC-A-SMA-MF	SMA Male	SMA Female	DC – 18.0	1.15
CC-A-SMA-MM	SMA Male	SMA Male	DC – 18.0	1.15
CC-A-SMAN-FF	SMA Female	N Female	DC – 18.0	1.14
CC-A-SMAN-MM	SMA Male	N Male	DC – 18.0	1.14
CC-A-SMAN-FM	SMA Female	N Male	DC – 18.0	1.14
CC-A-SMAN-MF	SMA Male	N Female	DC – 18.0	1.14
CC-A-N-FF	N Female	N Female	DC – 18.0	1.15
CC-A-N-MM	N Male	N Male	DC – 18.0	1.15
CC-A-N-MF	N Male	N Female	DC – 18.0	1.15
CC-A-35N-FF	3.5mm Female	N Female	DC – 18.0	1.14
CC-A-35N-MM	3.5mm Male	N Male	DC – 18.0	1.14
CC-A-35N-FM	3.5mm Female	N Male	DC – 18.0	1.14
CC-A-35N-MF	3.5mm Male	N Female	DC – 18.0	1.14
CC-A-35-FF	3.5mm Female	3.5mm Female	DC – 26.5	1.12
CC-A-35-MM	3.5mm Male	3.5mm Male	DC – 26.5	1.12
CC-A-35-MF	3.5mm Male	3.5mm Female	DC – 26.5	1.12
CC-A-2435-FF	2.4mm Female	3.5mm Female	DC – 26.5	1.10
CC-A-2435-MM	2.4mm Male	3.5mm Male	DC – 26.5	1.10
CC-A-2435-FM	2.4mm Female	3.5mm Male	DC – 26.5	1.10
CC-A-2435-MF	2.4mm Male	3.5mm Fem	DC – 26.5	1.10
CC-A-292-FF	2.92mm Female	2.92mm Female	DC – 40.0	1.14
CC-A-292-MM	2.92mm Male	2.92mm Male	DC – 40.0	1.14
CC-A-292-MF	2.92mm Male	2.92mm Female	DC – 40.0	1.14
CC-A-24292-FF	2.4mm Female	2.92mm Female	DC – 40.0	1.14
CC-A-24292-MM	2.4mm Male	2.92mm Male	DC – 40.0	1.14
CC-A-24292-FM	2.4mm Female	2.92mm Male	DC – 40.0	1.14
CC-A-24292-MF	2.4mm Male	2.92mm Female	DC – 40.0	1.14
CC-A-185292-FF	1.85mm Female	2.92mm Female	DC – 40.0	1.14
CC-A-185292-MM	1.85mm Male	2.92mm Male	DC – 40.0	1.14
CC-A-185292-FM	1.85mm Female	2.92mm Male	DC – 40.0	1.14
CC-A-185292-MF	1.85mm Male	2.92mm Female	DC – 40.0	1.14
CC-A-24-FF	2,4mm Female	2,4mm Female	DC – 50.0	1.17
CC-A-24-MM	2.4mm Male	2.4mm Male	DC – 50.0	1.17
CC-A-24-MF	2.4mm Male	2.4mm Female	DC – 50.0	1.17
CC-A-185-FF	1.85mm Female	1.85mm Female	DC – 67.0	1.20
CC-A-185-MM	1.85mm Male	1.85mm Male	DC – 67.0	1.20
CC-A-185-MF	1.85mm Male	1.85mm Female	DC – 67.0	1.20

Available Models

Test Essentials™ Lab Adapters				
Model	Connector 1	Connector 2	Frequency	VSWR
TE-A-SMA-FF	SMA Female	SMA Female	DC – 18.0	1.15
TE-A-SMA-MM	SMA Male	SMA Male	DC – 18.0	1.15
TE-A-SMA-MF	SMA Male	SMA Female	DC – 18.0	1.15
TE-A-SMAN-FF	SMA Female	N Female	DC – 18.0	1.15
TE-A-SMAN-MM	SMA Male	N Male	DC – 18.0	1.15
TE-A-SMAN-FM	SMA Female	N Male	DC – 18.0	1.15
TE-A-SMAN-MF	SMA Male	N Female	DC – 18.0	1.15
TE-A-N-FF	N Female	N Female	DC – 18.0	1.15
TE-A-N-MM	N Male	N Male	DC – 18.0	1.15
TE-A-N-MF	N Male	N Female	DC – 18.0	1.15
TE-A-35N-FF	3.5mm Female	N Female	DC – 18.0	1.15
TE-A-35N-MM	3.5mm Male	N Male	DC – 18.0	1.15
TE-A-35N-FM	3.5mm Female	N Male	DC – 18.0	1.15
TE-A-35N-MF	3.5mm Male	N Female	DC – 18.0	1.15
TE-A-35-FF	3.5mm Female	3.5mm Female	DC – 26.5	1.12
TE-A-35-MM	3.5mm Male	3.5mm Male	DC – 26.5	1.12
TE-A-35-MF	3.5mm Male	3.5mm Female	DC – 26.5	1.12
TE-A-2435-FF	2.4mm Female	3.5mm Female	DC – 26.5	1.10
TE-A-2435-MM	2.4mm Male	3.5mm Male	DC – 26.5	1.10
TE-A-2435-FM	2.4mm Female	3.5mm Male	DC – 26.5	1.10
TE-A-2435-MF	2.4mm Male	3.5mm Female	DC – 26.5	1.10
TE-A-292-FF	2.92mm Female	2.92mm Female	DC – 40.0	1.17
TE-A-292-MM	2.92mm Male	2.92mm Male	DC – 40.0	1.17
TE-A-292-MF	2.92mm Male	2.92mm Female	DC – 40.0	1.17
TE-A-24292-FF	2.4mm Female	2.92mm Female	DC – 40.0	1.14
TE-A-24292-MM	2.4mm Male	2.92mm Male	DC – 40.0	1.14
TE-A-24292-FM	2.4mm Female	2.92mm Male	DC – 40.0	1.14
TE-A-24292-MF	2.4mm Male	2.92mm Female	DC – 40.0	1.14
TE-A-185292-FF	1.85mm Female	2.92mm Female	DC – 40.0	1.14
TE-A-185292-MM	1.85mm Male	2.92mm Male	DC – 40.0	1.14
TE-A-185292-FM	1.85mm Female	2.92mm Male	DC – 40.0	1.14
TE-A-185292-MF	1.85mm Male	2.92mm Female	DC – 40.0	1.14
TE-A-24-FF	2,4mm Female	2.4mm Female	DC – 50.0	1.22
TE-A-24-MM	2.4mm Male	2.4mm Male	DC – 50.0	1.22
TE-A-24-MF	2.4mm Male	2.4mm Female	DC – 50.0	1.22
TE-A-185-FF	1.85mm Female	1.85mm Female	DC – 67.0	1.20
TE-A-185-MM	1.85mm Male	1.85mm Male	DC – 67.0	1.20
TE-A-185-MF	1.85mm Male	1.85mm Female	DC – 67.0	1.20

Calibration-Grade (Metrology) Adapters

GENERAL INFORMATION

Connecting With Confidence

Test and measurement data is only as good as the system used to generate it. Good test and measurement systems rely on high-performance precision adapters to ensure proper connection between system components – connections that ensure the accuracy, repeatability, and reliability of component performance. Over the last four-and-a-half decades, Maury has earned a reputation as a leading producer of high quality, precision adapters. Today, Maury offers adapters with a wider variety of connector types and combinations than any other manufacturer.

Maury adapters feature low reflection at the interface and dielectric support, negligible electromagnetic interference, excellent connection repeatability,rugged durability, and are guaranteed to perform reliably within their specifications even after multiple connection/disconnection cycles.

When you consider the relative ease of incorporation into system designs and applications, and the value versus life-cycle cost inherent in every Maury adapter, it is easy to understand their popularity. Engineers, designers and technicians alike know that with Maury adapters they can have the highest confidence in their component connections.

The following paragraphs describe the major categories of Maury's precision adapter line.

In-Series and Between-Series Adapters

Maury Microwave's comprehensive line of in-series and between-series coaxial adapters are available for all precision laboratory measurement connectors – 1.85mm, 2.4mm, 2.92mm (K), 3.5mm, 7mm, etc.; all common systems connectors – type N, TNC, etc.

Maury also manufactures adapters in other less common connector series not shown in this catalog. If you have a specific need and don't find a solution in these pages, please contact our Sales Department for assistance.

Phase Matched Adapters

Phase matched adapters are used in two-port VNA calibrations when the devices have same sex input and output connectors that must be tested. Through connection for calibration is made using adapters with female and male connectors. One adapter is then replaced to permit mating to the test device. With phase matched adapters, this can be done without significantly degrading the VNA error correction capability. Phase matched in-series and between-series adapters are noted as such in the following pages.

Ruggedized Test Port Adapters

Maury Test port adapters are specifically designed to mate with the special ruggedized connectors used on commercial VNA test sets, such as those used on Keysight PNA series VNAs and Anritsu 37000 series VNAs. Maury's test port adapters can convert those connectors to other coaxial or waveguide connector types. Using Maury test port adapters as connector savers can yield significant cost savings in terms of less VNA down time and repair costs.

NMD1.85mm/ 2.4mm/2.92mm/ 3.5mm Test Port Adapters

2633, 7809, 7909, 8719, 8009, AND 8829 SERIES

Features

- Low VSWR
- DC to 67 GHz (Usable to 70 GHz)
- Protects VNA Test Ports
- Ruggedized for Long Life

7809A1

7809A2

7809B3

7809B4

7809F3

7809F4

Description

Maury's NMD adapters are precision, low VSWR adapters designed to connect directly to the NMD-style test ports on certain Keysight test sets and VNA models (including those in the PNA series). They are fully compatible with the VNA test ports, and adapt to precision 1.85mm, 2.4mm, 2.92mm, 3.5mm, 7mm, and type N connectors. Maury test port adapters provide the best possible connection between the VNA and other precision cables and devices. Their rugged construction provides for long life and highly stable, highly repeatable connections. They also act as test port savers, by absorbing the wear and tear that would otherwise affect the test port; preventing costly repairs and eliminating downtime.

Connector Description

The NMD1.85mm female connectors on Maury 7809 series adapters are miniature, instrument grade, air-interface connectors. Rated for operate up to 67 GHz, they are usable up to 70 GHz. They comply with IEEE standard 287 general precision connector, instrument grade GPC1.85. For interface specifications please refer to Maury data sheet 5E-089.

The NMD2.4mm female connectors on Maury 7909 series adapters are miniature, instrument grade, air-interface connectors., rated for operate up to 50 GHz. They comply with IEEE standard 287 general precision connector, instrument grade GPC2.4.) For interface specifications please refer to Maury data sheet 5E-082. The NMD male connectors are mateable to NMD female connectors via external threads, and can also mate to non-NMD connectors via internal threads.

The NMD2.92mm connectors on Maury 8719 series adapters are ruggedized test-port connectors used for stable connection to a network analyzer. The female connector is only mateable to NMD male connectors via external threads on the male nut. The NMD male connectors are mateable to NMD female connectors via external threads, and can also mate to non-NMD connectors (2.92mm, SMA, or 3.5mm) via internal threads.

The NMD3.5mm female connectors on Maury test port adapters are miniature, instrument grade, air-interface connectors., rated for operate up to 18, 20 or 26.5 GHz, according to the range of the adapted connector type. For interface specifications please refer to Maury data sheet 5E-084. The NMD male connectors on 8009F1 units are mateable to NMD female connectors via external threads, and can also mate to non-NMD connectors via internal threads.

NMD1.85mm/2.4mm/2.92mm/3.5mm Test Port Adapters Available Models

MODEL	CONNECTORS		FREQUENCY RANGE (GHz) AND MAXIMUM VSWR	INSERTION LENGTH	
	SIDE A	SIDE B		INCHES	(CM)
7809A1	NMD1.85mm female	1.85mm female	DC — 26.5 ≤ 1.10 26.5 — 40.0 ≤ 1.15 40.0 — 67.0 ≤ 1.20	0.993	(2.52)
7809A2	NMD1.85mm female	1.85mm male		0.993	(2.52)
7809F3	NMD1.85mm female	2.92mm female	DC — 20.0 ≤ 1.10 20.0 — 40.0 ≤ 1.16	1.072	(2.72)
7809F4	NMD1.85mm female	2.92mm male		1.072	(2.72)
7809B3	NMD1.85mm female	3.5mm female	DC — 10.0 ≤ 1.06 10.0 — 20.0 ≤ 1.10 20.0 — 34.0 ≤ 1.12	1.085	(2.76)
7809B4	NMD1.85mm female	3.5mm male		1.085	(2.76)
7909A3	NMD2.4mm female	2.4mm female	DC — 26.5 ≤ 1.10 26.5 — 40.0 ≤ 1.15 40.0 — 50.0 ≤ 1.20	1.240	(3.15)
7909A4	NMD2.4mm female	2.4mm male		1.270	(3.23)
7909K1	NMD2.4mm female	NMD2.4mm male		1.317	(3.35)
7909F3	NMD2.4mm female	2.92mm female	DC — 20.0 ≤ 1.10 20.0 — 40.0 ≤ 1.16	1.291	(3.279)
7909F4	NMD2.4mm female	2.92mm male		1.291	(3.279)
7909J1	NMD2.4mm female	NMD2.92mm male		1.247	(3.17)
7909B3	NMD2.4mm female	3.5mm female	DC — 10.0 ≤ 1.06 10.0 — 20.0 ≤ 1.10 20.0 — 34.0 ≤ 1.12	1.060	(2.7)
7909B4	NMD2.4mm female	3.5mm male		1.020	(2.6)
7909H1	NMD2.4mm female	NMD3.5mm male		1.317	(3.35)
7909C1	NMD2.4mm female	7mm	DC — 4.0 ≤ 1.05 4.0 — 12.0 ≤ 1.07 12.0 — 18.0 ≤ 1.10	2.040	(5.18)
7909D3	NMD2.4mm female	Type N female	DC — 4.0 ≤ 1.08 4.0 — 12.0 ≤ 1.12 12.0 — 18.0 ≤ 1.14	1.280	(3.25)
7909D4	NMD2.4mm female	Type N male		1.640	(4.17)
8719A1	NMD 2.92mm Female	2.92mm Female	DC — 4.0 ≤ 1.05 4.0 — 20.0 ≤ 1.08 20.0 — 40.0 ≤ 1.12	1.23	(3.12)
8719B1	NMD 2.92mm Female	2.92mm Male		1.23	(3.12)
8009A1	NMD3.5mm female	3.5mm female	DC — 18.0 ≤ 1.08 18.0 — 26.5 ≤ 1.12	1.450	(3.68)
8009B1	NMD3.5mm female	3.5mm male		1.490	(3.79)
8009F1	NMD3.5mm female	NMD3.5mm male		1.490	(3.79)
2633C1	NMD3.5mm female	7mm	DC — 18.0 ≤ 1.018 + 0.003f	1.780	(4.53)
8829A1	NMD3.5mm female	Type N female	DC — 6.0 ≤ 1.04 6.0 — 18.0 ≤ 1.10	2.040	(5.18)
8829B1	NMD3.5mm female	Type N male		2.200	(5.59)

1.85mm Adapters

IN-SERIES AND
BETWEEN-SERIES

1.85mm

7821A *7821B* *7821C*

2.4mm

7824A1 *7824B1* *7824C1* *7824D1*

2.92mm

7826A1 *7826B1* *7826C1* *7826D1*

3.5mm

7827A1 *7827B1* *7827C1* *7827D1*

Description

The precision adapters in these model series are designed to allow devices with 1.85mm connectors to mate with devices and cables bearing 2.4mm, 2.92mm, or 3.5mm connectors. When properly mated, they provide a low VSWR connection with low insertion loss and high repeatability. Made of highly durable materials, these adapters are ideal for use in laboratory and production environments where frequent connect/ disconnect cycles occur.

These adapters are phase matched within each model series, so that they may be easily interchanged for VNA measurement of non-insertable devices.

1.85mm Connector Description

The precision 1.85mm connectors on these adapters are miniature, instrument grade, air-interface connectors that are rated for operation from DC to 67 GHz, but may be used up to 70 GHz. They comply with IEEE standard 287 for instrument grade general precision connectors (GPC1.85).

1.85mm Adapters Available Models

MODEL	CONNECTORS		FREQUENCY RANGE (GHz) AND MAXIMUM VSWR	INSERTION LENGTH	
	SIDE A	SIDE B		INCHES	(CM)
7821A[1]	1.85mm female	1.85mm female	DC — 26.5 ≤ 1.06 26.5 — 40.0 ≤ 1.10 40.0 — 67.0 ≤ 1.15	0.750	(1.905)
7821B[1]	1.85mm male	1.85mm male		0.750	(1.905)
7821C[1]	1.85mm female	1.85mm male		0.750	(1.905)
7824A1[2]	1.85mm female	2.4mm female	DC — 26.5 ≤ 1.06 26.5 — 40.0 ≤ 1.10 40.0 — 50.0 ≤ 1.15	0.750	(1.905)
7824B1[2]	1.85mm female	2.4mm male		0.750	(1.905)
7824C1[2]	1.85mm male	2.4mm female		0.750	(1.905)
7824D1[2]	1.85mm male	2.4mm male		0.750	(1.905)
7826A1[3]	1.85mm female	2.92mm female	DC — 4.0 ≤ 1.05 4.0 — 20.0 ≤ 1.08 20.0 — 40.0 ≤ 1.12	0.657	(1.669)
7826B1[3]	1.85mm female	2.92mm male		0.657	(1.669)
7826C1[3]	1.85mm male	2.92mm female		0.657	(1.669)
7826D1[3]	1.85mm male	2.92mm male		0.657	(1.669)
7827A1[4]	1.85mm female	3.5mm female	DC — 4.0 ≤ 1.05 4.0 — 26.5 ≤ 1.08 26.5 — 34.0 ≤ 1.12	0.657	(1.669)
7827B1[4]	1.85mm female	3.5mm male		0.657	(1.669)
7827C1[4]	1.85mm male	3.5mm female		0.657	(1.669)
7827D1[4]	1.85mm male	3.5mm male		0.657	(1.669)

[1-4] References to families that are phase matched.

2.4mm Adapters

IN-SERIES AND
BETWEEN-SERIES

2.4mm

7921A1 *7921D1* *7921C1* *7921B1*

2.92mm

7926A1 *7926B1* *7926C1* *7926D1*

3.5mm

7927A1 *7927B1* *7927C1* *7927D1*

7mm

7922A1 *7922B1*

Type N

7923A *7923B* *7923C* *7923D*

Description

In-Series Description - Maury precision 2.4mm in-series adapters are low VSWR and low-loss devices that operate from DC to 50 GHz. The models 7921A, B and C offer combinations for in-series adapting and are phase matched, making them ideal for use in precision measurement applications. These adapters are minimum length and feature a square-flanged body for ease of connecting that also prevents them from rolling off flat surfaces. They are useful as “test port savers” when used with automated network analyzers such as the Keysight 8510, etc. The models 7921D1 and E are bulk-head and panel mount feed-thru adapters respectively, and are designed for instrumentation applications.

Between-Series Description -The precision adapters in these model series are designed to allow devices with 2.4mm connectors to mate with devices and cables bearing 2.92mm, 3.5mm, 7mm or Type N connectors. When properly mated, they provide a low VSWR connection with low insertion loss and high repeatability. Made of highly durable materials, these adapters are ideal for use in laboratory and production environments where frequent connect/ disconnect cycles occur.

Except for the 7923 series, these adapters are phase matched within each model series, so that they may be easily inter-changed for VNA measurement of non-insertable devices.

2.4mm Connector Description

The precision 2.4mm connectors on these adapters are miniature, instrument grade, air-interface connectors that are rated for operation from DC to 50 GHz. They comply with IEEE standard 287 for instrument grade general precision connectors (GPC2.4).

2.4mm Adapters Available Models

MODEL	CONNECTORS		FREQUENCY RANGE (GHz) AND MAXIMUM VSWR	INSERTION LENGTH	
	SIDE A	SIDE B		INCHES	(CM)
7921A1[1]	2.4mm female	2.4mm female	DC — 26.5 ≤ 1.08 26.5 — 40.0 ≤ 1.12 40.0 — 50.0 ≤ 1.15	0.750	(1.905)
7921B1[1]	2.4mm male	2.4mm male		0.750	(1.905)
7921C1[1]	2.4mm female	2.4mm male		0.750	(1.905)
7921D1[2]	2.4mm female	2.4mm female		0.860	(2.18)
7824A1[3]	1.85mm female	2.4mm female		0.750	(1.905)
7824B1[3]	1.85mm female	2.4mm male		0.750	(1.905)
7824C1[3]	1.85mm male	2.4mm female		0.750	(1.905)
7824D1[3]	1.85mm male	2.4mm male		0.750	(1.905)
7926A1[4]	2.4mm female	2.92mm female	DC — 4.0 ≤ 1.05 4.0 — 20.0 ≤ 1.08 20.0 — 40.0 ≤ 1.14	0.650	(1.65)
7926B1[4]	2.4mm female	2.92mm male		0.650	(1.65)
7926C1[4]	2.4mm male	2.92mm female		0.650	(1.65)
7926D1[4]	2.4mm male	2.92mm male		0.650	(1.65)
7927A1[5]	2.4mm female	3.5mm female	DC — 18.0 ≤ 1.06 18.0 — 26.5 ≤ 1.08 26.5 — 34.0 ≤ 1.12	0.657	(1.669)
7927B1[5]	2.4mm female	3.5mm male		0.657	(1.669)
7927C1[5]	2.4mm male	3.5mm female		0.657	(1.669)
7927D1[5]	2.4mm male	3.5mm male		0.657	(1.669)
7922A1[6]	2.4mm female	7mm	DC — 4.0 ≤ 1.04 4.0 — 12.0 ≤ 1.07 12.0 — 18.0 ≤ 1.10	1.280	(3.25)
7922B1[6]	2.4mm male	7mm		1.280	(3.25)
7923A[7]	2.4mm female	Type N female	DC — 4.0 ≤ 1.07 4.0 — 18.0 ≤ 1.12	1.220	(3.10)
7923B[8]	2.4mm female	Type N male		1.580	(4.02)
7923C[7]	2.4mm male	Type N female		1.200	(3.05)
7923D[8]	2.4mm male	Type N male		1.560	(3.96)

[1-8] References to families that are phase matched.

2.92mm Adapters

IN-SERIES AND
BETWEEN-SERIES

2.92mm

8714A2 *8714D1* *8714B2* *8714C2* *8714E1*

Type N

8723A *8723B*

8723C *8723D*

7mm

8725A1 *8725B1*

Description

In-Series Description - Maury precision 2.92mm (K) in-series adapters are low VSWR and low-loss devices that operate from DC to 40 GHz. The models 8714A2, B2 and C2 offer all combinations for adapting and are ideal for using with precision measurement applications. These adapters are minimum length, phase matched and feature a square-flange body for ease of connecting and prevents rolling off tables. They are useful as “test port savers” when used with vector network analyzers such as the Keysight 8510, etc. The 8714D1 and 8714E1 are bulkhead and panel mount feedthru adapters respectively, designed for instrumentation applications.

Between-Series Description - The precision adapters in these model series are designed to allow devices with 2.92mm connectors to mate with devices and cables bearing 7mm or Type N connectors. When properly mated, they provide a low VSWR connection with low insertion loss and high repeatability. Made of highly durable materials, these adapters are ideal for use in laboratory and production environments where frequent connect/ disconnect cycles occur.

The 8725A1 and 8725B1 adapters are phase matched to each other so that they may be easily interchanged for network analyzer measurement of non-insertable devices.

2.92mm Connector Description

The K connector was originally introduced by Maury in 1974 as the MPC3 connector and re-introduced by Wiltron in 1984 as the K connector. They comply with IEEE standard 287 general precision connector, instrument grade (GPC2.92).

2.92mm Adapters Available Models

MODEL	CONNECTORS		FREQUENCY RANGE (GHz) AND MAXIMUM VSWR	INSERTION LENGTH	
	SIDE A	SIDE B		INCHES	(CM)
8714A2[1]	2.92mm female	2.92mm female	DC — 4.0 ≤ 1.05 4.0 — 20.0 ≤ 1.09 20.0 — 40.0 ≤ 1.13	0.650	(1.65)
8714B2[1]	2.92mm male	2.92mm male		0.650	(1.65)
8714C2[1]	2.92mm female	2.92mm male		0.650	(1.65)
8714D1[2]	2.92mm female	2.92mm female		0.850	(2.15)
8714E1[2]	2.92mm female	2.92mm female		0.850	(2.15)
7826A1[3]	1.85mm female	2.92mm female	DC — 4.0 ≤ 1.05 4.0 — 20.0 ≤ 1.08 20.0 — 40.0 ≤ 1.12	0.657	(1.669)
7826B1[3]	1.85mm female	2.92mm male		0.657	(1.669)
7826C1[3]	1.85mm male	2.92mm female		0.657	(1.669)
7826D1[3]	1.85mm male	2.92mm male		0.657	(1.669)
7926A[4]	2.4mm female	2.92mm female	DC — 4.0 ≤ 1.05 4.0 — 20.0 ≤ 1.08 20.0 — 40.0 ≤ 1.14	0.650	(1.65)
7926B1[4]	2.4mm female	2.92mm male		0.650	(1.65)
7926C1[4]	2.4mm male	2.92mm female		0.650	(1.65)
7926D1[4]	2.4mm male	2.92mm male		0.650	(1.65)
8725A1[5]	2.92mm female	7mm	DC — 4.0 ≤ 1.05 4.0 — 12.0 ≤ 1.07 12.0 — 18.0 ≤ 1.10	1.670	(4.24)
8725B1[5]	2.92mm male	7mm		1.670	(4.24)
8723A[6]	2.92mm female	Type N female	DC — 4.0 ≤ 1.07 4.0 — 12.0 ≤ 1.10 12.0 — 18.0 ≤ 1.17	1.614	(4.099)
8723B[7]	2.92mm female	Type N male		1.914	(5.014)
8723C[6]	2.92mm male	Type N female		1.614	(4.099)
8723D[7]	2.92mm male	Type N male		1.914	(5.014)

[1-7] References to families that are phase matched.

3.5mm Adapters

IN-SERIES AND
BETWEEN-SERIES

3.5mm

8021A3 *8021B3* *8021C3*

8021D2 *8021E2*

TNC

8025A1 *8025C1*

BNC

8023A *8028B1*

Type N

8023C *8023B1*

Description

In-Series Description - These precision 3.5mm adapters are low VSWR and low-loss models that operate from DC to 34 GHz. The 8021A2/B2/C2 series are designed for in-series adapting and are phase matched, making them ideal for use in precision measurement applications. They are minimum length and feature a square-flanged body to prevent them from rolling off flat surfaces. They serve as “test port savers” when used with network analyzers such as the Keysight PNA-X, etc.

Several designs are available for instrumentation applications: 8021D2 is a bulkhead feedthru model, 8021E2 is a panel mount model.

Between-Series Description -These precision adapters are used to connect 3.5mm devices to cables or devices with the connector types listed below. Low VSWR, low insertion loss and high repeatability, make these rugged, highly durable adapters ideal for use wherever frequent connect/disconnect cycles occur. Most are phase matched within their model series.

3.5mm Connector Description

Rated from DC to 34 GHz, the precision 3.5mm miniature, air-interface connectors on these adapters comply with IEEE standard 287 for instrument grade general precision connectors (GPC3.5). See Maury data sheet 5E-062 for interface dimensions.

3.5mm Adapters Available Models

MODEL	CONNECTORS		FREQUENCY RANGE (GHz) AND MAXIMUM VSWR	INSERTION LENGTH	
	SIDE A	SIDE B		INCHES	(CM)
8021A3[1]	3.5mm female	3.5mm female	DC — 18.0 ≤ 1.06 18.0 — 26.5 ≤ 1.09 26.5 — 34.0 ≤ 1.13	0.650	(1.65)
8021B3[1]	3.5mm male	3.5mm male		0.650	(1.65)
8021C3[1]	3.5mm female	3.5mm male		0.650	(1.65)
8021D2[2]	3.5mm female	3.5mm female	DC — 18.0 ≤ 1.07 18.0 — 26.5 ≤ 1.10 26.5 — 34.0 ≤ 1.14	0.850	(2.15)
8021E2[2]	3.5mm female	3.5mm female		0.850	(2.15)
7827A1[3]	1.85mm female	3.5mm female	DC — 4.0 ≤ 1.05 4.0 — 26.5 ≤ 1.08 26.5 — 34.0 ≤ 1.12	0.657	(1.669)
7827B1[3]	1.85mm female	3.5mm male		0.657	(1.669)
7827C1[3]	1.85mm male	3.5mm female		0.657	(1.669)
7827D1[3]	1.85mm male	3.5mm male		0.657	(1.669)
7927A1[4]	2.4mm female	3.5mm female	DC — 18.0 ≤ 1.06 18.0 — 26.5 ≤ 1.08 26.5 — 34.0 ≤ 1.12	0.657	(1.669)
7927B1[4]	2.4mm female	3.5mm male		0.657	(1.669)
7927C1[4]	2.4mm male	3.5mm female		0.657	(1.669)
7927D1[4]	2.4mm male	3.5mm male		0.657	(1.669)
8022S1[5]	3.5mm female	7mm	DC — 4.0 ≤ 1.04 4.0 — 18.0 ≤ 1.09	1.220	(3.10)
8022T1[4]	3.5mm male	7mm		1.220	(3.10)
8023A[6]	3.5mm female	Type N female	DC — 4.0 ≤ 1.065 4.0 — 18.0 ≤ 1.13	1.620	(4.11)
8023B1[6]	3.5mm female	Type N male		1.620	(4.11)
8023C[6]	3.5mm male	Type N female		1.620	(4.11)
8023D1[6]	3.5mm male	Type N male		1.620	(4.11)
8025A1[7]	3.5mm female	TNC female	DC — 4.0 ≤ 1.04 4.0 — 8.0 ≤ 1.14 8.0 — 18.0 ≤ 1.20	1.610	(4.10)
8025B1[7]	3.5mm female	TNC male		1.610	(4.10)
8025C1[7]	3.5mm male	TNC female		1.610	(4.10)
8025D1[7]	3.5mm male	TNC male		1.610	(4.10)
8028A1[8]	3.5mm female	BNC female	DC — 4.0 ≤ 1.10 4.0 — 10.0 ≤ 1.20	2.000	(5.08)
8028B1[9]	3.5mm female	BNC male		1.910	(4.85)
8028C1[8]	3.5mm male	BNC female		2.000	(5.08)
8028D1[9]	3.5mm male	BNC male		1.910	(4.85)
8682A1	3.5mm female	AFTNC female	DC — 4.0 ≤ 1.04 4.0 — 12.0 ≤ 1.06 12.0 — 20.0 ≤ 1.08	1.34	(3.40)
8682B1	3.5mm female	AFTNC male		1.29	(3.28)
8682C1	3.5mm male	AFTNC female		1.34	(3.40)
8682D1	3.5mm male	AFTNC male		1.29	(3.28)

[1-9] References to families that are phase matched.

3.5mm (QT3.5mm™) Quick Test Adapters

8006 SERIES (U.S. PATENT NO. 6,210,221)

Description

The QT3.5mm™ male connector incorporates a quick connect design that provides for a push-on/pull-off capability that mates with any commercially available 3.5mm connectors. The optional quick 1-1/2 turn twist nut combines the best of both worlds allowing quick connect or disconnect with the increased accuracy of a thread-on connector. In addition to the no nut and quick turn nut designs, a guide sleeve configuration is available to provide a self-aligning capability required in automated test stations.

The push-on connector offers excellent repeatability and long life making these adapters ideal for use in a production environment. The nut can also be torqued to 8 in. lbs making them suitable for test port applications where a calibration is required. The connectors come in four configurations: no nut, a 3/8" diameter nut, a 9/16" diameter nut, and a guide sleeve configuration.

Features

- Quick, Easy Push-On/Pull-Off Design
- Designed for Durability and Long Life (3,000 Connect/Disconnect Cycles)
- Excellent Repeatability/Low VSWR
- Guide Sleeve Design for Automated applications

8006E1 No Nut *8006E11 3/8" Nut* *8006E21 9/16" Nut* *8006Q1 Guide Sleeve*

Repeatability*

MODE	DC — 18 GHz	18 — 26.5 GHz
Push-On	> 40 dB	> 40 dB
Torqued to 8 in. lbs	> 50 dB	> 50 dB
Hand Torqued	> 50 dB	> 50 dB

**Repeatability is based on a minimum of 3,000 connect/disconnect cycles.*

Available Models

MODEL	ADAPTS		FREQUENCY RANGE (GHz)	MAXIMUM VSWR (GHz)
	SIDE A	SIDE B		
8006E1 8006E11 8006E21 8006Q1	QT3.5mm™ (m) with no nut QT3.5mm™ (m) with 3/8" diameter nut QT3.5mm™ (m) with 9/16" diameter nut QT3.5mm™ (m) guide sleeve	3.5mm (f)	DC — 26.5[1]	DC — 16.0 ≤ 1.06 16.0 — 26.5 ≤ 1.09 26.5 — 34.0 ≤ 1.13

[1] *Slightly reduced VSWR specifications to 34 GHz.*

7mm Adapters

BETWEEN-SERIES

Description

Maury offers an extensive line of precision 7mm adapters in all common laboratory and systems connector types. 7mm adapters are also available for special purpose connections such as EIA rigid line connectors. Female and male adapters in the same connector series are phase matched for VNA applications.

7mm Connector Description

Maury precision 7mm connectors are miniature, instrument grade, air-interface connectors rated for operation from DC to 18 GHz. They comply with IEEE standard 287 for instrument grade general precision connectors (GPC7). They are normally made with gold-plated beryllium copper bodies and have a six-slot heat treated gold-plated beryllium copper center conductor contact for improved repeatability and durability. See Maury data sheet 5E-060 for interface dimensions.

Available Models

MODEL	CONNECTORS		FREQUENCY RANGE (GHz) AND MAXIMUM VSWR	INSERTION LENGTH	
	SIDE A	SIDE B		INCHES	(CM)
7922A1[1]	2.4mm female	7mm	DC — 4.0 ≤ 1.04 4.0 — 12.0 ≤ 1.07 12.0 — 18.0 ≤ 1.10	1.280	(3.25)
7922B1[1]	2.4mm male	7mm		1.280	(3.25)
8725A1[2]	2.92mm female	7mm	DC — 4.0 ≤ 1.05 4.0 — 12.0 ≤ 1.07 12.0 — 18.0 ≤ 1.10	1.670	(4.24)
8725B1[2]	2.92mm male	7mm		1.670	(4.24)
8022S1[3]	3.5mm female	7mm	DC — 4.0 ≤ 1.04 4.0 — 18.0 ≤ 1.09	1.220	(3.10)
8022T1[3]	3.5mm male	7mm		1.220	(3.10)
2606C[4]	7mm	Type N female	DC — 4.0 ≤ 1.04 4.0 — 9.0 ≤ 1.05 9.0 — 18.0 ≤ 1.09	1.510	(3.84)
2606D[4]	7mm	Type N male		1.510	(3.84)
2622A1	7mm	TNC female	DC — 4.0 ≤ 1.05 4.0 — 18.0 ≤ 1.15	1.680	(4.26)
2622B	7mm	TNC male		1.550	(3.94)
2625A[5]	7mm	SMA female	DC — 4.0 ≤ 1.05 4.0 — 10.0 ≤ 1.08 10.0 — 18.0 ≤ 1.16	1.670	(4.24)
2625B[5]	7mm	SMA male		1.670	(4.24)
8582D3[6]	7mm	BNC 75Ω female	DC — 12.0 ≤ 1.60	2.060	(5.23)
8582D4[6]	7mm	BNC 75Ω male		2.060	(5.23)

[1-6] References to families that are phase matched.

Type N Adapters

IN-SERIES AND
BETWEEN-SERIES

TNC

8817B

Type N

8828A2

8828C2

8828B2

BNC

8821B1

8821A1

Description

In-Series Description - The 8828 precision type N in-series adapters feature extremely low VSWR with low insertion loss, and are phase matched (having the same electrical insertion length) so they may be readily interchanged in network analyzer measurement applications. They are constructed with aluminum bodies. Connector bodies are made from stainless steel, and the center conductors are made from gold plated, heat treated beryllium.

Between-Series Description -Maury precision type N between-series adapters are designed for general purpose laboratory use and high precision measurement applications. They exhibit low VSWR and low insertion loss across the frequency range of the adapted connector, and are built to the same rigorous quality standards as the type N in-series adapters.

Type N Connector Description

The Maury type N connectors on these adapters are precision, miniature, instrument grade, air-interface connectors, rated for operation from DC to 18 GHz. They comply with IEEE standard 287 for instrument grade general precision connectors (GPC Type N), and meet most applicable interface requirements of MIL-C-39012/1 (see footnote 2, in Figure 1 below) and they meet all applicable interface requirements of MIL-C-39012/2. The connectors will mate properly with MIL-C-71, MIL-C-39012, MIL-T-81490 and most other semi-precision type N connectors. The male connectors are provided with a 0.75-inch hex coupling nut so they can be properly torqued to 12 in. lbs. The connectors have stainless steel bodies with heat treated gold-plated beryllium copper contacts.

Type N Adapters Available Models

MODEL	CONNECTORS		FREQUENCY RANGE (GHz) AND MAXIMUM VSWR	INSERTION LENGTH	
	SIDE A	SIDE B		INCHES	(CM)
8828A2[1]	Type N female	Type N female	DC — 4.0 ≤ 1.04 4.0 — 10.0 ≤ 1.06 10.0 — 18.0 ≤ 1.11	2.500	(6.35)
8828B2[1]	Type N male	Type N male		2.500	(6.35)
8828C2[1]	Type N female	Type N male		2.500	(6.35)
7923A	2.4mm female	Type N female	DC — 4.0 ≤ 1.07 4.0 — 18.0 ≤ 1.12	1.220	(3.10)
7923B	2.4mm female	Type N male		1.580	(4.02)
7923C	2.4mm male	Type N female		1.200	(3.05)
7923D	2.4mm male	Type N male		1.560	(3.96)
8723A[2]	2.92mm female	Type N female	DC — 4.0 ≤ 1.07 4.0 — 12.0 ≤ 1.10 12.0 — 18.0 ≤ 1.17	1.614	(4.099)
8723B[3]	2.92mm female	Type N male		1.914	(5.014)
8723C[2]	2.92mm male	Type N female		1.614	(4.099)
8723D[3]	2.92mm male	Type N male		1.914	(5.014)
8023A[4]	3.5mm female	Type N female	DC — 4.0 ≤ 1.065 4.0 — 18.0 ≤ 1.13	1.620	(4.11)
8023B1[4]	3.5mm female	Type N male		1.620	(4.11)
8023C[4]	3.5mm male	Type N female		1.620	(4.11)
8023D1[4]	3.5mm male	Type N male		1.620	(4.11)
2606C[5]	7mm	Type N female	DC — 4.0 ≤ 1.04 4.0 — 9.0 ≤ 1.05 9.0 — 18.0 ≤ 1.09	1.510	(3.84)
2606D[5]	7mm	Type N male		1.510	(3.84)
8817A	Type N female	TNC female	DC — 4.0 ≤ 1.065 4.0 — 8.0 ≤ 1.10 8.0 — 12.0 ≤ 1.12 12.0 — 18.0 ≤ 1.14	1.170	(2.97)
8817B	Type N female	TNC male		1.500	(3.81)
8817C	Type N male	TNC female		1.530	(3.89)
8817D	Type N male	TNC male		1.86	(4.72)
8821A1	Type N female	BNC female	DC — 4.0 ≤ 1.08 4.0 — 10.0 ≤ 1.20	2.370	(6.02)
8821B1	Type N female	BNC male		2.010	(5.11)
8821C1	Type N male	BNC female		2.460	(6.25)
8821D1	Type N male	BNC male		2.100	(5.33)

[1-7] References to families that are phase matched.

TNC Adapters

IN-SERIES AND
BETWEEN-SERIES

TNC

232A2 232B2 232C2

Description

Because TNC interfaces vary from maker to maker, compatibility must be verified before connectors of different specification types are mated. Mating different specification types degrades electrical performance and risks damage to connector interfaces. Maury application note 5A-031 discusses the most common TNC connectors and compatibility issues that arise if specification types are mixed. See also Maury data sheet 5E-057A to check the compatibility of your TNC connectors.

TNC Connector Descriptions

Maury offers two precision TNC connector designs:

MPC/TNC – Precision TNC connectors that mate with most commercially available TNC connectors and specifically with MIL-C-39012/26/27 test connectors or MIL-T-81490 connectors. This design is also used with some modifications – in the 232A2/B2/C2 models.

These adapters are recommended for use with dielectrically loaded TNC interfaces. Because they are ideal for use in VNA application these adapters are provided in Maury 8650CK series VNA calibration kits (see page 114).

Models 232A2/B2/C2 are designed per the Maury 5E-053A interface standard; an improved MPC/TNC version that is mating compatible with all common military and IEC specification TNC connectors. This includes MIL-STD-348A standard and test connectors (which replace MIL-C-39012 connectors), MIL-T-81490, and IEC 169-17 G0 and G2 connectors.

All 232 series adapters exhibit low VSWR when properly mated and are usable to 18 GHz.

Available Models

MODEL	CONNECTORS		FREQUENCY RANGE (GHz) AND MAXIMUM VSWR	INSERTION LENGTH	
	SIDE A	SIDE B		INCHES	(CM)
232A11	TNC female	TNC female	DC — 4.0 ≤ 1.06 4.0 — 7.0 ≤ 1.10 7.0 — 18.0 ≤ 1.14	1.350	(3.43)
232B11	TNC male	TNC male		1.350	(3.43)
232C11	TNC female	TNC male		1.350	(3.43)
232A2	TNC female	TNC female	DC — 4.0 ≤ 1.06 4.0 — 7.0 ≤ 1.10 7.0 — 18.0 ≤ 1.14	1.350	(3.43)
232B2	TNC male	TNC male		1.350	(3.43)
232C2	TNC female	TNC male		1.350	(3.43)
8025A1	3.5mm female	TNC female	DC — 4.0 ≤ 1.04 4.0 — 8.0 ≤ 1.14 8.0 — 18.0 ≤ 1.20	1.610	(4.10)
8025B1	3.5mm female	TNC male		1.610	(4.10)
8025C1	3.5mm male	TNC female		1.610	(4.10)
8025D1	3.5mm male	TNC male		1.610	(4.10)
2622A1	7mm	TNC female	DC — 4.0 ≤ 1.05 4.0 — 18.0 ≤ 1.15	1.680	(4.26)
2622B	7mm	TNC male		1.550	(3.94)
8817A	Type N female	TNC female	DC — 4.0 ≤ 1.065 4.0 — 8.0 ≤ 1.10 8.0 — 12.0 ≤ 1.12 12.0 — 18.0 ≤ 1.14	1.170	(2.97)
8817B	Type N female	TNC male		1.500	(3.81)
8817C	Type N male	TNC female		1.530	(3.89)
8817D	Type N male	TNC male		0.186	(4.72)

BNC & SMA Adapters

BNC Connector Description

Maury BNC series connectors are 75-ohm or 50-ohm impedance connectors with two-stud bayonet coupling. These connectors conform to MIL-C-39012. The connectors are normally made with stainless steel bodies with heat treated gold plated beryllium copper contacts.

SMA Connector Description

The Maury SMA connectors are miniature, instrument grade, dielectric loaded interface connectors that are rated for operation from DC to 18 GHz. The comply with Mil-C-39012. NOTE: SMA connectors, 3.5mm connectors, and 2.92mm connectors are mateable.

Available Models

MODEL	CONNECTORS		FREQUENCY RANGE (GHz) AND MAXIMUM VSWR	INSERTION LENGTH	
	SIDE A	SIDE B		INCHES	(CM)
8028A1[1]	3.5mm female	BNC 50Ω female	DC — 4.0 ≤ 1.10 4.0 — 10.0 ≤ 1.20	2.000	(5.08)
8028B1[2]	3.5mm female	BNC 50Ω male		1.910	(4.85)
8028C1[1]	3.5mm male	BNC 50Ω female		2.000	(5.08)
8028D1[2]	3.5mm male	BNC 50Ω male		1.910	(4.85)
2625A[3]	7mm	SMA female	DC — 4.0 ≤ 1.05 4.0 — 10.0 ≤ 1.08 10.0 — 18.0 ≤ 1.16	1.670	(4.24)
2625B[3]	7mm	SMA male		1.670	(4.24)
8582D3[4]	7mm	BNC 75Ω female	DC — 12.0 ≤ 1.60	2.060	(5.23)
8582D4[4]	7mm	BNC 75Ω male		2.060	(5.23)
8821A1	Type N female	BNC 50Ω female	DC — 4.0 ≤ 1.08 4.0 — 10.0 ≤ 1.20	2.100	(5.33)
8821B1	Type N female	BNC 50Ω male		2.010	(5.11)
8821C1	Type N male	BNC 50Ω female		2.460	(6.25)
8821D1	Type N male	BNC 50Ω male		2.370	(6.02)

[1-4] References to families that are phase matched.

Waveguide-To-Coaxial Adapters — Right Angle Launch

WR90–WR22 TO 2.4MM, 2.92MM, 3.5MM, 7MM, AND TYPE N

7mm P209D8 *3.5mm N200A8* *2.92mm U211C6*

General Information

Maury produces a comprehensive lines of waveguide to coaxial adapters. Our adapters set the standards for high precision laboratory test and measurement applications, and for systems applications where accuracy and durability are important. These adapters feature precision index holes and lapped flanges to facilitate proper mating; ensuring that your system will deliver the critical performance demanded by the most exacting measurement tasks.

Maury waveguide to coaxial adapters include right angle and end launch configurations. They are available in all common waveguide sizes, covering frequencies from 8.2 to 50 GHz. They adapt to 2.4mm, 2.92mm, 3.5mm, 7mm, and type N coaxial connector types.

Description

Maury right angle launch adapters feature low VSWR and low insertion loss. Except where noted, flanges are in accordance with the listing on page 134. Most of the adapters shown incorporate precision index holes in the flange for precise mating alignment and connection repeatability. Please consult the factory for detailed flange interface information.

Specifications

Frequency Range -- 8.20 – 50.00 GHz (in waveguide bands)

Flanges -- Cover Type, see page 134

VSWR Options

Improved VSWR is provided on adapters with a numeric suffix to the model number (e.g., X200A8).

Model Suffix	Maximum VSWR
8	1.07
1	1.10
6	1.15
3	1.20

Many adapters can be provided with improved VSWR over their full or partial waveguide bands. Our Sales Department will gladly assist you with this and other application specific requirements. Information on specific models such as loss, power handling and dimensions will be provided on request.

Waveguide-To-Coaxial Adapters — Right Angle Launch

Available Models

Right Angle Launch EIA WR to 2.4mm, 2.92mm and 3.5mm Connectors

FREQUENCY RANGE (GHz)	EIA WR NUMBER	MODEL (BY COAXIAL CONNECTOR TYPE)					
		2.4mm female	2.4mm male	2.92mm female	2.92mm male	3.5mm female	3.5mm male
8.20 – 12.40	90	—	—	—	—	X200C8	X200D8
10.00 – 15.00	75	—	—	—	—	M200A8	M200B8
12.40 – 18.00	62	—	—	—	—	P200A8	P200D8
15.00 – 22.00	51	—	—	—	—	N200A8	N200B8
18.00 – 26.50	42	K236A1	K236B1	—	—	K200A1	K200B1
22.00 – 33.00	34	Q236A1	Q236D1	—	—	Q200C3	Q200B3
26.50 – 40.00	28	U236C6	U236D6	U210C6	U211C6	—	—
33.00 – 50.00	22	J236A3	J236B3	—	—	—	—

Right Angle Launch EIA WR to 7mm and Type N Connectors

FREQUENCY RANGE (GHz)	EIA WR NUMBER	MODEL (BY COAXIAL CONNECTOR TYPE)		
		7mm	Type N female	Type N male
8.20 – 12.40	90	X209D8	X213D8	X214D8
10.00 – 15.00	75	M209D8	M213D8	M214D8
12.40 – 18.00	62	P209E8	P213E8	P214E8

Waveguide-To-Coaxial Adapters — End Launch

WR430–WR22 TO 2.4MM, 2.92MM, 3.5MM, 7MM, AND TYPE N

K233B8
WR42 -to-2.92mm
Male

U237A1
WR28 -to-2.4mm
Female

General Information

Maury produces a comprehensive lines of waveguide to coaxial adapters. Our adapters set the standards for high precision laboratory test and measurement applications, and for systems applications where accuracy and durability are important. These adapters feature precision index holes and lapped flanges to facilitate proper mating; ensuring that your system will deliver the critical performance demanded by the most exacting measurement tasks.

Maury waveguide to coaxial adapters include right angle and end launch configurations. They are available in all common rectangular waveguide sizes, covering frequencies from 8.2 to 50 GHz. They adapt to 2.4mm, 2.92mm, 3.5mm, 7mm, type N and SMA coaxial connector types.

Description

Maury end launch adapters feature low VSWR and low insertion loss. Except where noted, flanges are in accordance with the listing on page 134. Most of the adapters shown incorporate precision index holes in the flange for precise mating alignment and connection repeatability. Please contact us for detailed flange interface information.

Specifications

Frequency Range -- 8.20 – 50.00 GHz (in waveguide bands)

Flanges -- Cover Type, see page 134

VSWR Options

Improved VSWR is provided on adapters with a numeric suffix to the model number (e.g.,X230A1).

Model Suffix	Maximum VSWR
8	1.07
1	1.10
6	1.15
3	1.20

Many adapters can be provided with improved VSWR over their full or partial waveguide bands. Our Sales Department will gladly assist you with this and other application specific requirements. Information on specific models such as loss, power handling and dimensions will be provided on request.

Waveguide-To-Coaxial Adapters — End Launch

Available Models

End Launch EIA WR to 2.4mm, 2.92mm, and 3.5mm Connectors

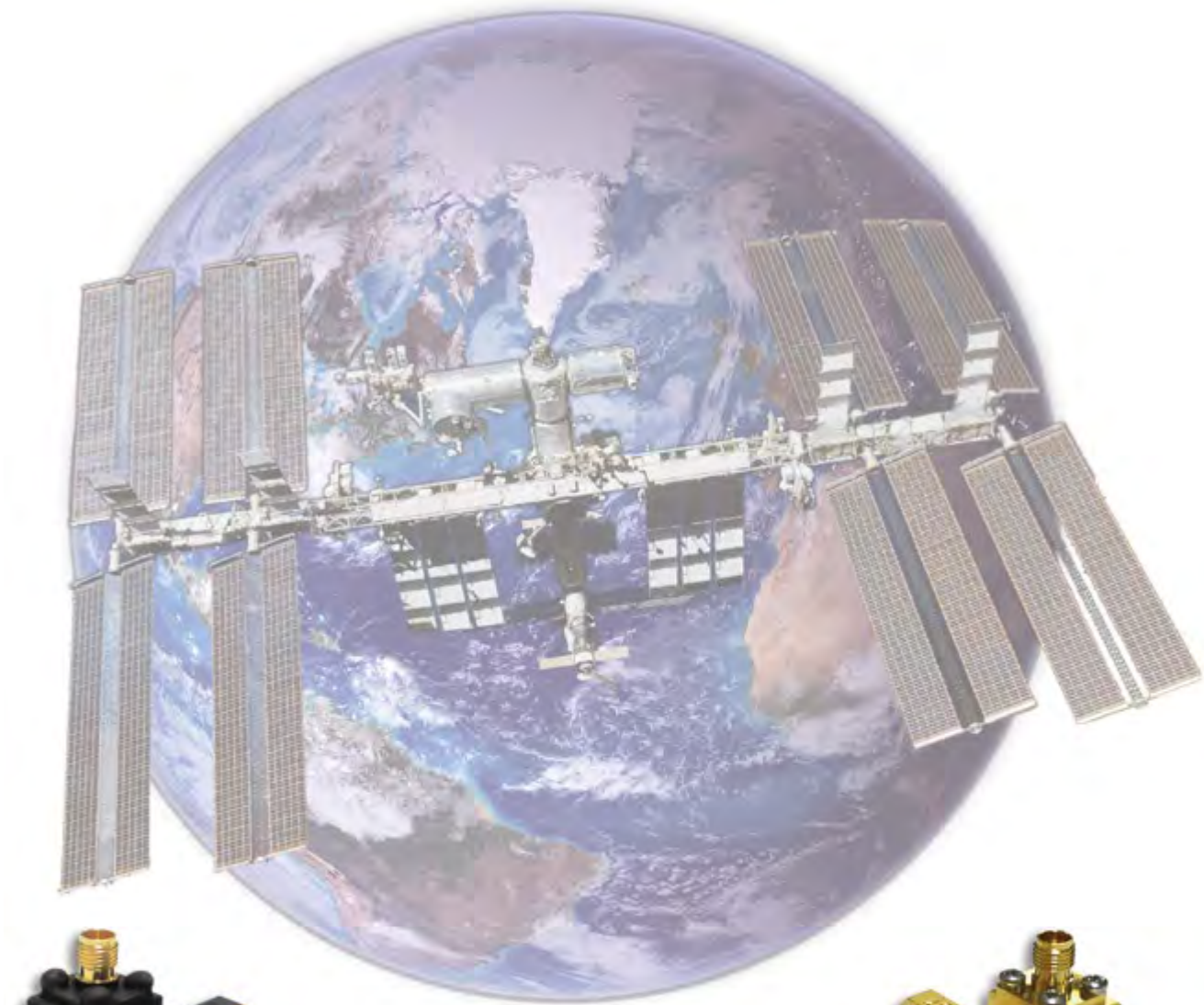
FREQUENCY RANGE (GHz)	EIA WR NUMBER	MODEL (BY COAXIAL CONNECTOR TYPE)					
		2.4mm female	2.4mm male	2.92mm female	2.92mm male	3.5mm female	3.5mm male
8.20 – 12.40	90	—	—	—	—	X230A1	X230B1
10.00 – 15.00	75	—	—	—	—	M230A1	M230B1
12.40 – 18.00	62	—	—	—	—	P230A8	P230B8
15.00 – 22.00	51	—	—	—	—	N230A3	N230B3
18.00 – 26.50	42	K237C8	K237D8	K233A8	K233B8	K230C6	K230D6
22.00 – 33.00	34	Q237A8	Q237B8	—	—	—	—
26.50 – 40.00	28	U237C1	U237D1	U233A1	U233B1	—	—
33.00 – 50.00	22	J237A6	J237B6	—	—	—	—

End Launch EIA WR to 7mm and Type N Connectors

FREQUENCY RANGE (GHz)	EIA WR NUMBER	MODEL (BY COAXIAL CONNECTOR TYPE)		
		7mm	Type N female	Type N male
8.20 – 12.40	90	X229B8	X221C8	X221D8
10.00 – 15.00	75	M229B8	M221A8	M221B8
12.40 – 18.00	62	P229B8	P221A8	P221D8

Space Qualified Adapters

Maury Microwave offers an extensive line of precision Space Qualified waveguide-to-coaxial adapters for use in satellite communications and other space applications. Our unique designs, special materials, plating and coating processes, enable us to produce adapters that operate with optimum performance and reliability under the extreme conditions encountered in space. Maury Space Qualified adapters are available in right angle and end launch versions and can be provided in many waveguide size and connector configurations. Weight-saving designs, custom flanges and beadless versions for harsh radiation exposure are also available, with full band or optimized narrow band performance ranges. These adapters can be qualified under Group A/B/C environmental testing, including Thermal Shock, Vibration, Operating Temperature Extremes, and EMI — all tailored to your exact specifications. Please call our Sales Department for more information.



N232P01 *N233P01* *N233P02* *N234P02*

Test Port Cable Assemblies

Features and Benefits

- Industry's best phase stability with flexure improves measurement accuracy and ensures repeatable and reliable measurements
- Superior flexibility and anti-skid band ensures the cables can be arbitrarily positioned with no spring-back or stress on DUT
- Increased crush resistance and flex cycles enhances longevity and can lead to years of uninterrupted use
- Color-coded connectors reduce potential for connection mistakes
- The best amplitude and phase stability reduces measurement uncertainty and increases confidence in measurements
- Standard lengths and connector configurations in stock; custom lengths and configurations available

Available Models - Cable Assemblies

Connector	Model Number	Connector Type 1	Connector Type 2	Cable Length		Frequency Range (GHz)
				Inches	CM	
1.85mm	SV-185-FM-25	NMD 1.85mm - Female	NMD 1.85mm - Male	25	63.5	DC - 67
	SV-185-FF-25		1.85mm - Female			
	SV-185-FM-38		NMD 1.85mm - Male	38	96.5	
	SV-185-FF-38		1.85mm - Female			
	SV-185-FM-48		NMD 1.85mm - Male	48	121.9	
	SV-185-FF-48		1.85mm - Female			
2.4mm	SV-24-FM-25	NMD 2.4mm - Female	NMD 2.4mm - Male	25	63.5	DC - 50
	SV-24-FF-25		2.4mm - Female			
	SV-24-FM-38		NMD 2.4mm - Male	38	96.5	
	SV-24-FF-38		2.4mm - Female			
	SV-24-FM-48		NMD 2.4mm - Male	48	121.9	
	SV-24-FF-48		2.4mm - Female			
2.92mm	SV-292-FM-25	NMD 2.92mm - Female	NMD 2.92mm - Male	25	63.5	DC - 40
	SV-292-FF-25		2.92mm - Female			
	SV-292-FM-38		NMD 2.92mm - Male	38	96.5	
	SV-292-FF-38		2.92mm - Female			
	SV-292-FM-48		NMD 2.92mm - Male	48	121.9	
	SV-292-FF-48		2.92mm - Female			
2.4mm to 2.92mm	SV-24292-FM-25	NMD 2.4mm - Female	NMD 2.92mm - Male	25	63.5	DC - 40
	SV-24292-FF-25		2.92mm - Female			
	SV-24292-FM-38		NMD 2.92mm - Male	38	96.5	
	SV-24292-FF-38		2.92mm - Female			
	SV-24292-FM-48		NMD 2.92mm - Male	48	121.9	
	SV-24292-FF-48		2.92mm - Female			
3.5mm	SV-35-FM-25	NMD 3.5mm - Female	NMD 3.5mm - Male	25	63.5	DC - 26.5
	SV-35-FF-25		3.5mm - Female			
	SV-35-FM-38		NMD 3.5mm - Male	38	96.5	
	SV-35-FF-38		3.5mm - Female			
	SV-35-FM-48		NMD 3.5mm - Male	48	121.9	
	SV-35-FF-48		3.5mm - Female			
7mm	SV-7-XX-25	7mm - Genderless	7mm - Genderless	25	63.5	DC - 18
	SV-7-XX-38			38	96.5	
	SV-7-XX-48			48	121.9	

Stability Specifications

StabilityVNA™ Cable Type	Frequency	Length	Typical Phase Stability with Flexure	Typical Amplitude Stability with Flexure
SV-185	67 GHz	25"	±4.0°	±0.05 dB
		38"	±5.0°	±0.07 dB
SV-24	50 GHz	25"	±2.0°	±0.02 dB
		38"	±4.0°	±0.03 dB
SV-292	40 GHz	25"	±2.0°	±0.02 dB
		38"	±3.0°	
SV-35	26.5 GHz	25"	±2.0°	±0.02 dB
		38"		
SV-7	18 GHz	25"	±2.0°	±0.02 dB
		38"		

DATA SHEET
2Z-002

Electrical Specifications

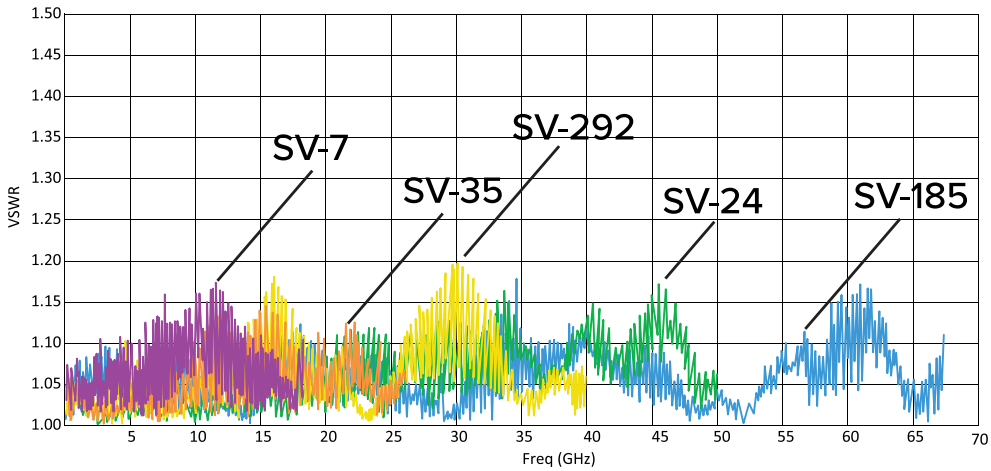
StabilityVNA™ Cable Type	SV-185			SV-24			SV-292 and SV-24292			SV-35			SV-7		
Maximum Frequency	67 GHz			50 GHz			40 GHz			26.5 GHz			18 GHz		
Typical Insertion Loss (cable only)	1.79 dB/ft			1.00 dB/ft			0.89 dB/ft			0.72 dB/ft			0.59 dB/ft		
VSWR (typical)	1.35:1			1.25:1			1.25:1			1.18:1					
VSWR (maximum)	1.40:1			1.35:1			1.32:1			1.25:1			1.25:1		
Cable Length (in)	25	38	48	25	38	48	25	38	48	25	38	48	25	38	48
Typical Insertion Loss (dB)	4.36	6.35	7.88	2.70	3.79	4.62	2.41	3.37	4.11	1.95	2.73	3.32	1.42	2.05	2.54
Max Insertion Loss (dB)	4.69	6.68	8.21	2.98	4.07	4.90	2.66	3.62	4.37	2.16	2.93	3.53	1.77	2.41	2.90
Typical Phase Stability (degree)	4.0	5.0	7.0	2.0	4.0		2.0	3.0		2.0		3.0	2.0		3.0
Max Phase Stability (degree)	7.0	9.0		3.5	8.0		3.0	6.0		2.7	5.5		2.5	4.0	
Typical Amplitude Stability (dB)	0.05	0.07		0.02	0.03		0.02	0.03		0.02	0.03		0.02	0.03	
Max Amplitude Stability (dB)	0.15	0.20		0.08	0.10	0.13	0.08	0.10		0.08	0.10		0.08	0.10	
Impedance (nominal)	50 ohm														
Velocity of Propogation	74% (nominal)														
Shielding Effectiveness	>100 dB (DC - 18 GHz)														
Time Delay (nominal)	1.34 ns/ft (4.5 ns/m)														

Mechanical Specifications

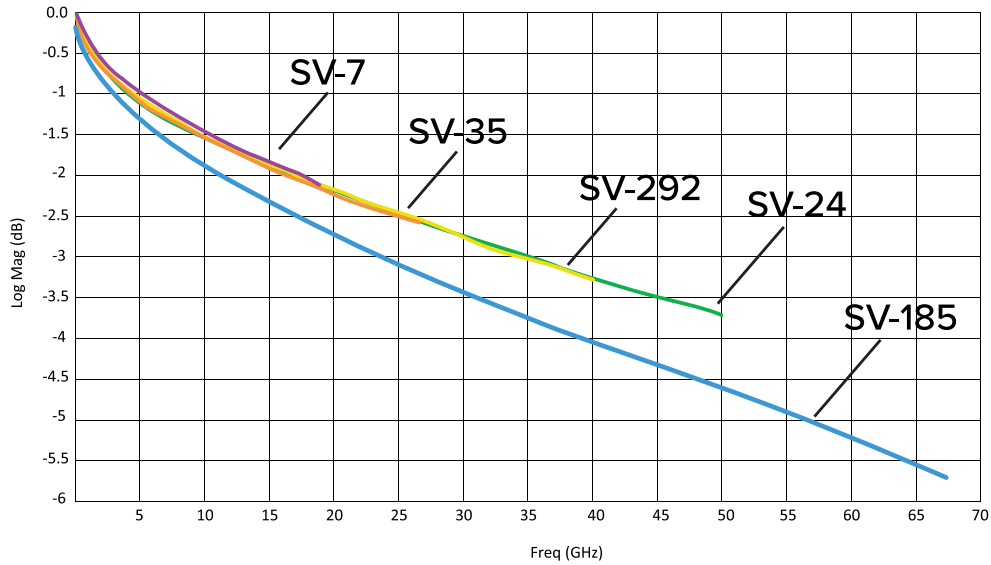
StabilityVNA™ Cable Type	SV-185			SV-24			SV-292 and SV-24292			SV-35			SV-7		
Cable Outer Diameter (nominal)	0.6 in (15.1mm)														
Cable Length (in)	25	38	48	25	38	48	25	38	48	25	38	48	25	38	48
Nominal Weight	11.1 oz/ft (315g/m)	13.6 oz/ft (385g/m)	16.1 oz/ft (455g/m)	11.1 oz/ft (315g/m)	13.6 oz/ft (385g/m)	16.1 oz/ft (455g/m)	11.1 oz/ft (315g/m)	13.6 oz/ft (385g/m)	16.1 oz/ft (455g/m)	11.1 oz/ft (315g/m)	13.6 oz/ft (385g/m)	16.1 oz/ft (455g/m)	11.1 oz/ft (315g/m)	13.6 oz/ft (385g/m)	16.1 oz/ft (455g/m)
Flex Life Cycles (typical)	>50,000														
Min. Bend Radius	2.00 in (50mm)														
Crush Resistance	>839 lbsf/in (150 kgf/cm)														
Operating Temperature Range	64.4°F to 82.4°F (18°C to 28°C)														

Maury StabilityVNA™ Cable Assembly Typical Performance

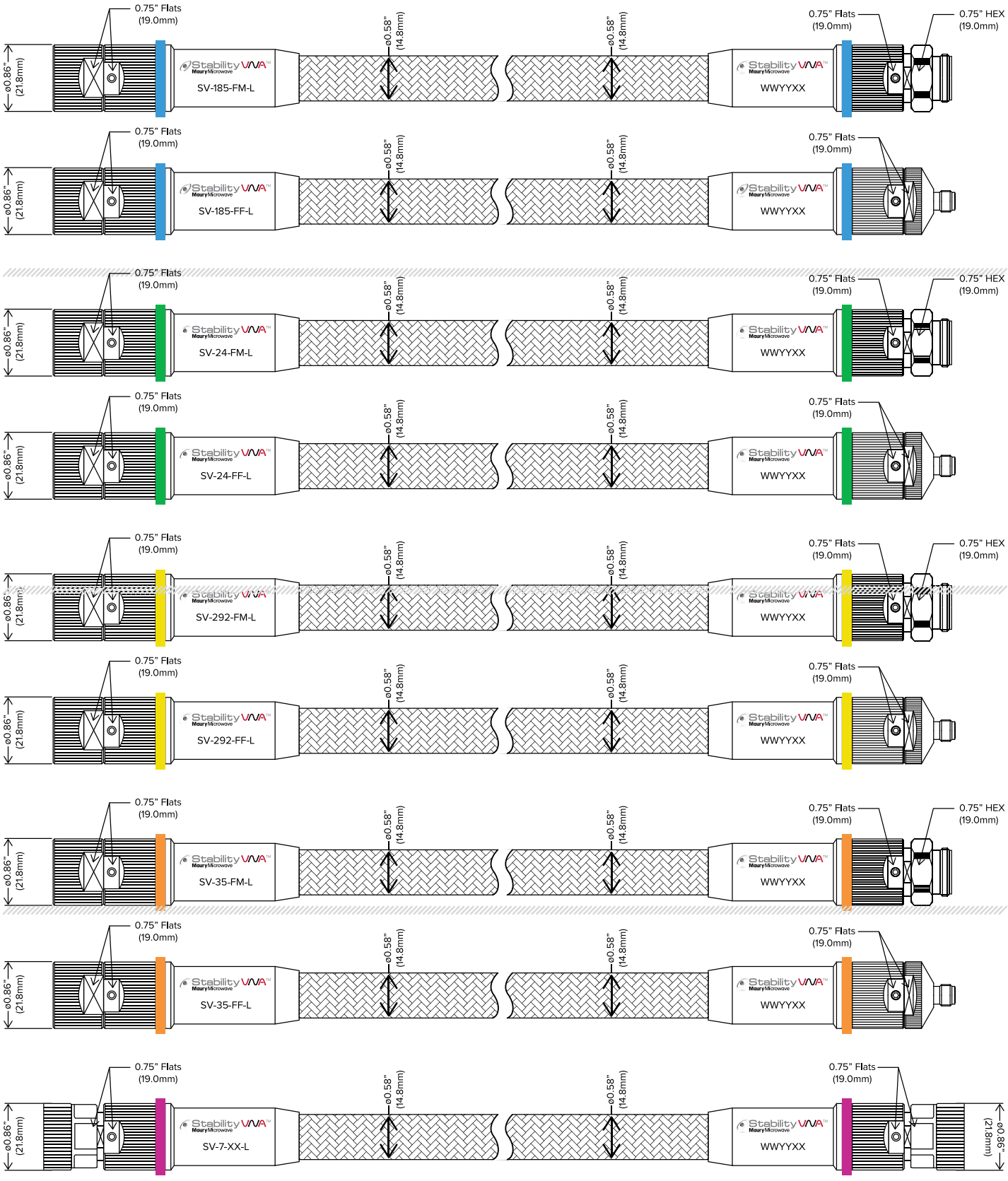
Maury StabilityVNA™ 38" Cable Assembly Typical VSWR



Maury StabilityVNA™ 38" Cable Assembly Typical Insertion Loss



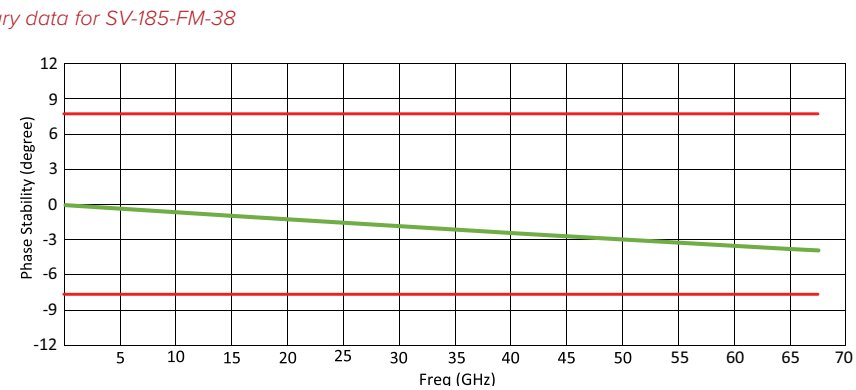
StabilityPlus™ Dimensions



Phase Stability

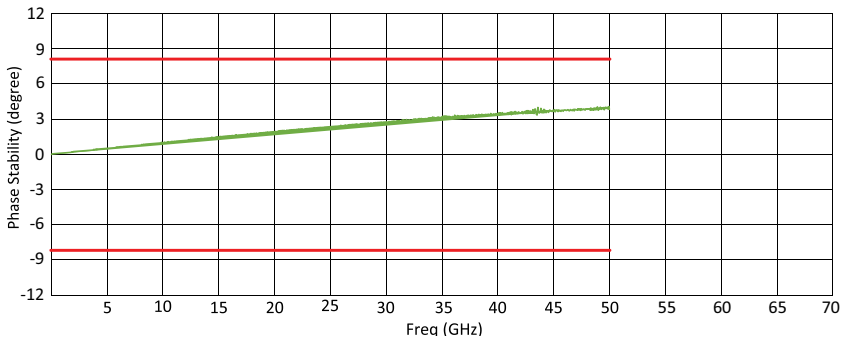
The maximum value for phase and amplitude stability was established using the following method. The cable was terminated with a short. With the cable in a straight position the VNA was normalized. The cable was coiled 180° around a mandrel 4 inches in diameter counter-clockwise and held in position for one sweep. The maximum deviation over the frequency range was recorded. The cable was then coiled 180° around the mandrel clockwise and held in position for one sweep and the maximum deviation was recorded. The cable was then returned to its original position for one sweep and the maximum deviation was recorded.

The plots on the right show the recorded worst-case phase variation.

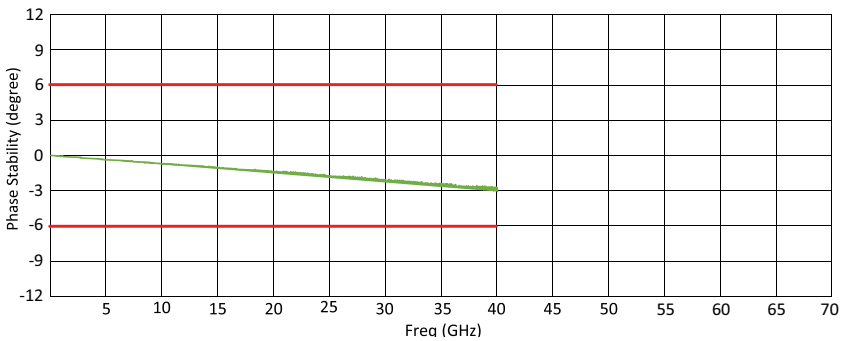


Exemplary data for SV-185-FM-38

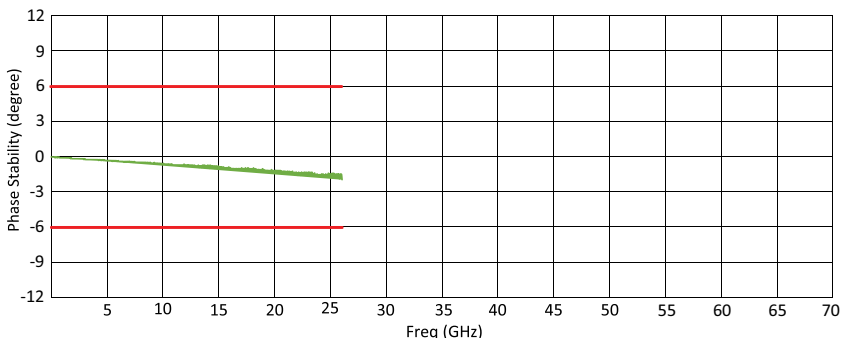
Exemplary data for SV-24-FM-38



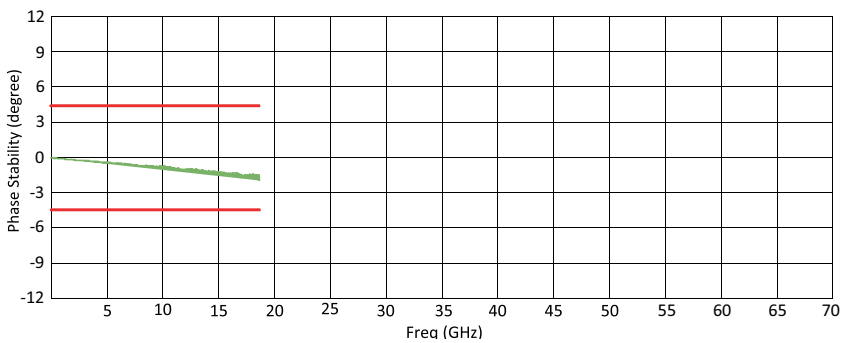
Exemplary data for SV-292-FM-38



Exemplary data for SV-35-FM-38



Exemplary data for SV-7-XX-38



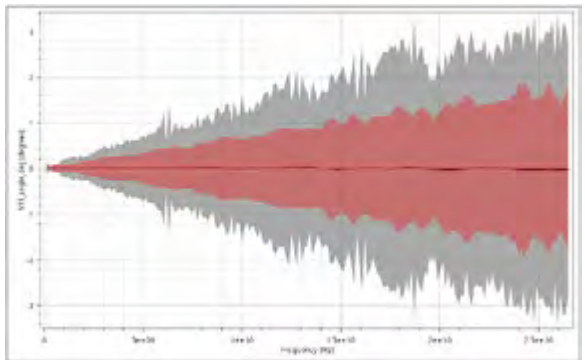
S-parameter measurements with uncertainty

A cable's *phase stability with flexure* specification is a metric used to communicate the impact of cable movement on a DUT measurement. It implies that lower specifications lessen the impact on the measurement (i.e. a cable with a 2° phase stability with flexure specification will have a lesser impact on a measurement than a cable with a 5° phase stability). However, the methods used to determine this specification may not be consistent across manufacturers, and likely do not represent the actual cable movement range of a user.

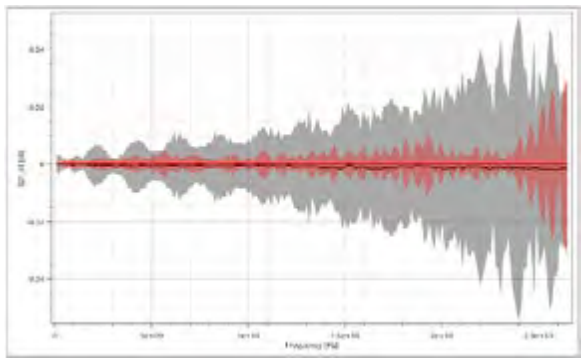
A better metric to understand a cable's impact on a DUT measurement is "uncertainty contribution". The cable's impact on measurement uncertainty can be calculated by moving the cable through a user's actual range of motion and recording the S-parameters across the movement. This technique has been thoroughly documented by the European Association of National Metrology Institutes (EURAMET)* and has been made commercially available in Maury's Insight™** calibration and measurement software platform.

The plots on the right show typical S-parameter measurements with uncertainty boundaries on different types of DUTs. The boundaries shown only consider the cable's direct contribution on measurement uncertainty.

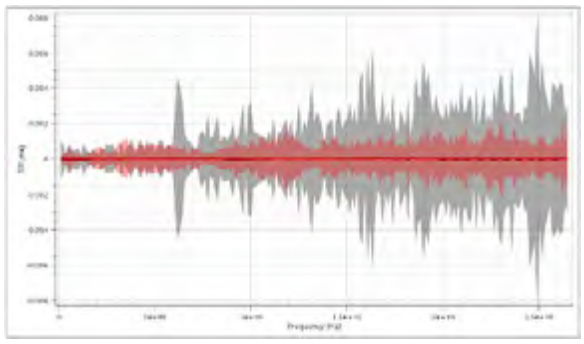
** https://www.maurymw.com/pdf/I-CAL-GUI-012.pdf*
*** https://www.maurymw.com/Precision/Insight_Software.php*



S11_phase measured on a short circuit termination SV-35-FM-38 shown in red; leading global competitor shown in grey



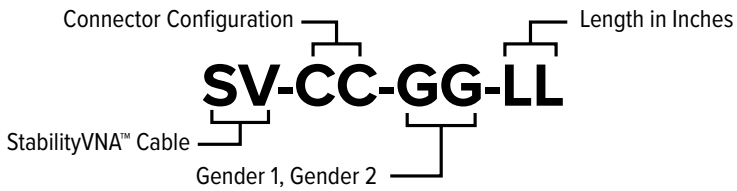
S21_mag measured on a short circuit termination SV-35-FM-38 shown in red; leading global competitor shown in grey



S11_mag measured on a short circuit termination SV-35-FM-38 shown in red; leading global competitor shown in grey

Ordering Instructions for StabilityVNA™ Cable Assemblies

Standard StabilityVNA™ Cable Assemblies



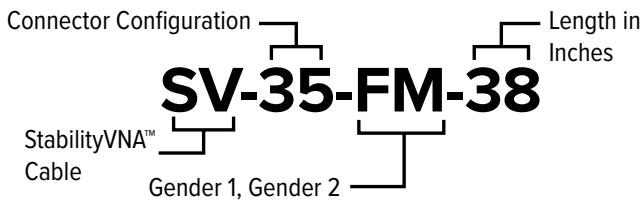
CC	GG	LL (Standard Lengths)
35 (3.5mm) 292 (2.92mm) 24 (2.4mm) 185 (1.85mm) 7 (7mm)	FM (NMD Female to NMD Male) FF (NMD Female to Standard Female) *XX (Genderless to Genderless) *FX (NMD Female to Genderless) *XM (Genderless to NMD Male) *XF (Genderless to Standard Female)	25 38 48

NOTE: Custom lengths and configurations available

EXAMPLE:

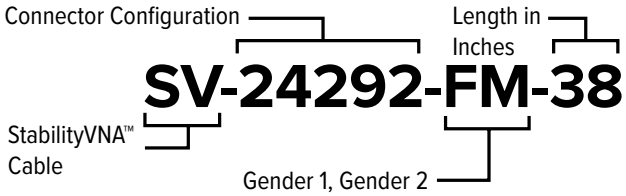
The following is a StabilityVNA™ cable assembly with 3.5mm NMD Female to NMD Male connectors, and 38 inches overall length.

Configuration Sample



EXAMPLE:

The following is a StabilityVNA™ cable assembly with 2.4mm NMD Female connector on one end and 2.92mm NMD Male connector on the other end, and 38 inches overall length.



StabilityPlus™ Microwave/RF Cable Assemblies

SERIES SP-185 , SP-24, SP-292, SP-35, SP-SMA, SP-N, SP-7, AND SP-TNCA

Features and Benefits

- Industry's best phase phase stability with flexure
- Amplitude stable with flexure
- Increased flexibility
- Reliable and repeatable measurements
- Longer flex life

Typical Applications

- Vector network analyzers (VNAs)
- RF and microwave instruments
- Bench-top testing
- RF production testing
- ATE systems

Description

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.

StabilityPlus™ cable assemblies are now part of the ColorConnect™ family! Following the proposed IEEE high-frequency connector/adapter color convention, StabilityPlus™ cable assemblies are the first commercially available assemblies 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 interconnects.

Stability Specifications

StabilityPlus™ Cable Type	Frequency	Typical Phase Stability with Flexure	Typical Amplitude Stability with Flexure
SP-185	67 GHz	±6°	±0.05 dB
SP-24	50 GHz	±4°	±0.05 dB
SP-292	40 GHz	±2°	±0.02 dB
SP-35	26.5 GHz	±2°	±0.02 dB
SP-SMA	26.5 GHz	±2°	±0.02 dB
SP-N	18 GHz	±2°	±0.02 dB
SP-7	18 GHz	±2°	±0.02 dB
SP-TNCA	18 GHz	±2°	±0.02 dB

Standard Cable Assembly Specifications

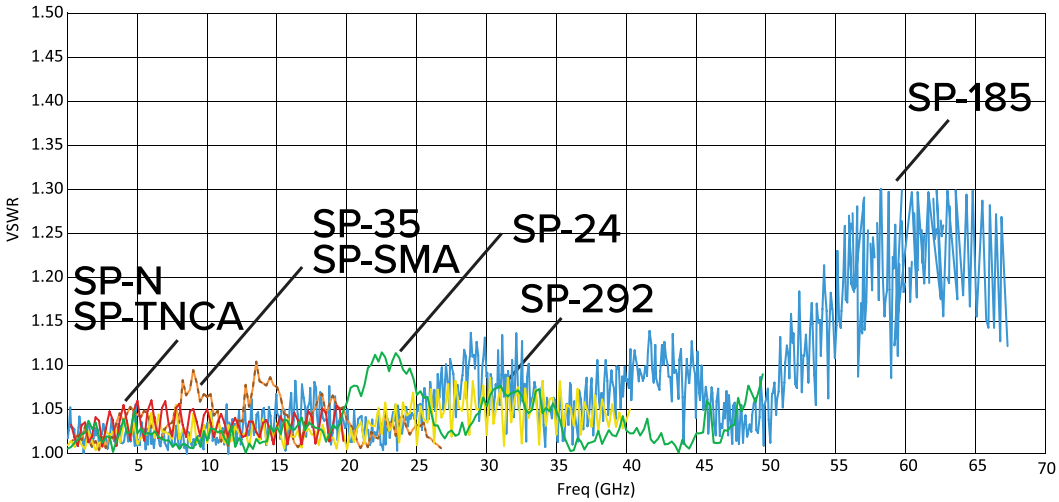
StabilityPlus™ Cable Type	SP-185	SP-24	SP-292	SP-35	SP-SMA	SP-N	SP-7	SP-TNCA
Maximum Frequency	67 GHz	50 GHz	40 GHz	26.5 GHz		18 GHz		
VSWR (typical)	1.20:1	1.15:1	1.10:1					
Typical Insertion Loss (cable only)	1.70 dB/ft	0.95 dB/ft	0.84 dB/ft	0.68 dB/ft		0.55 dB/ft		
Impedance (nominal)	50 ohm							
Phase Stability vs Flexure (typical)	±6°	± 4°	± 2°					
Phase Stability vs Flexure (maximum)	±14°	± 10.5°	± 8.5°	± 5.5°		± 4.2°		
Amplitude Stability vs Flexure (typical)	± 0.05 dB		± 0.02 dB					
Amplitude Stability vs Flexure (maximum)	±0.20 dB	± 0.10 dB						
Phase Stability vs Temp	<4°/m/GHz (–55°+105°C)							
Velocity of Propagation	74% (nominal)							
Shielding Effectiveness	>100 dB (DC - 18 GHz)							
Time Delay (nominal)	1.34 ns/ft (4.5 ns/m)							

Mechanical / Environmental Properties

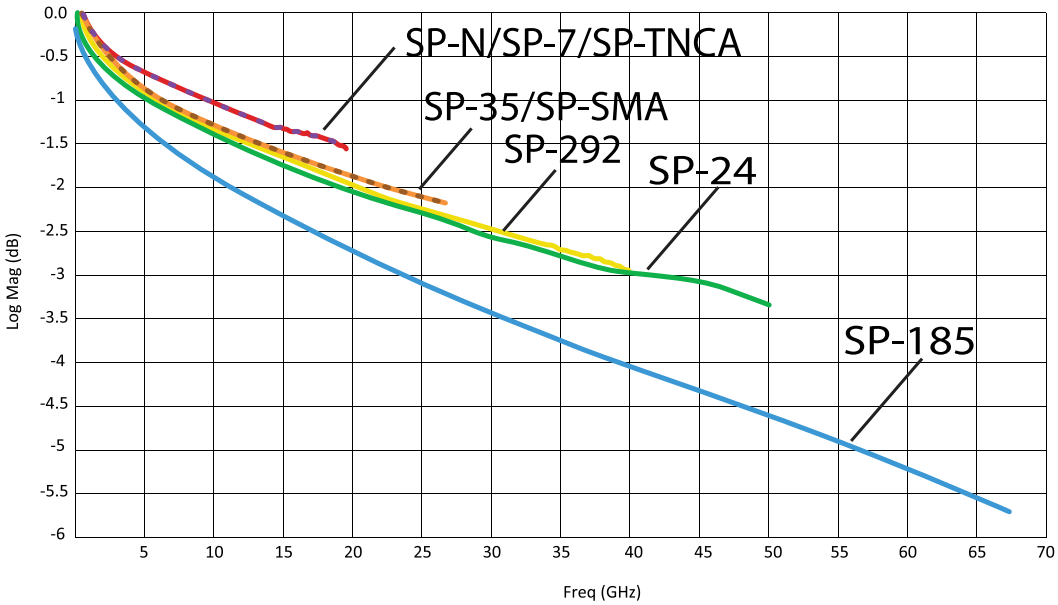
StabilityPlus™ Cable Type	SP-185	SP-24, SP-292, SP-35, AND SP-SMA	SP-N	SP-7	SP-TNCA
Center Conductor Material	Silver Plated Copper				
Maximum Outer Diameter (Connector)	0.42 in (10.7mm)	0.49 in (12.5mm)	0.870 (22mm)	0.875 in (22.22mm)	0.64in (16.25mm)
Maximum Outer Diameter (Cable)	0.2 in. (5mm)	0.25 in (6.35mm)			
Nominal Weight	0.677 oz/ft (63g/m)	0.97 oz/ft (90g/m)			
Min. Static Bend Radius/ Min. Dynamic Bend Radius	1.0 in (25.4mm)/2.0 in (50.8mm)				
Flex Life Cycles	>15,000				
Connector Mating Cycles	>5,000				
Crush Resistance	>254 lbf/in (44 kgf/cm)	>305 lbf/in (54 kgf/cm)			
Operating Temperature Range	–67°F to 221°F (–55°C to 105°C)				
RoHS/REACH	Yes				

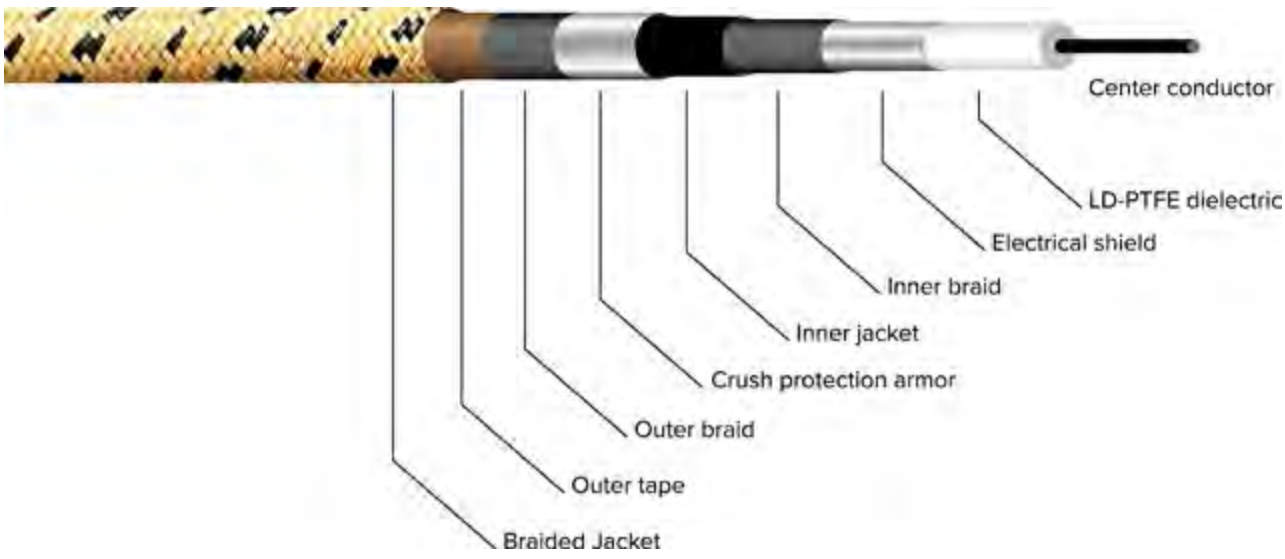
Maury StabilityPlus™ Cable Assembly Typical Performance

Maury StabilityPlus™ 36" Cable Assembly Typical VSWR



Maury StabilityPlus™ 36" Cable Assembly Typical Insertion Loss





Max Insertion Loss/Attenuation

(1:1 VSWR, 25 C, Sea Level, Cable Only)

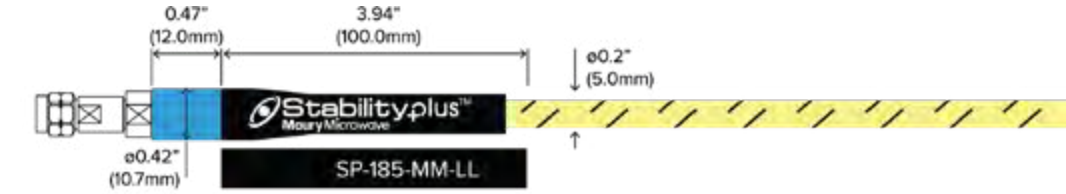
Freq (GHz)	SP-185 (dB/100 ft)	SP-24 (dB/100 ft)	SP-292 (dB/100 ft)	SP-35/SP-SMA (dB/100 ft)	SP-N/SP-7/SP-TNCA (dB/100 ft)
1	19.20	13.3	13.3	13.3	13.3
2	27.37	19.00	19.00	19.00	19.00
4	39.14	27.00	27.00	27.00	27.00
6	48.35	33.20	33.20	33.20	33.20
8	56.23	38.40	38.40	38.40	38.40
12	69.70	47.40	47.40	47.40	47.40
18	86.57	58.50	58.50	58.50	58.50
26.5	106.77	71.60	71.60	71.60	—
40	133.94	88.90	88.90	—	—
50	151.70	100.10	—	—	—
67	179.00	—	—	—	—

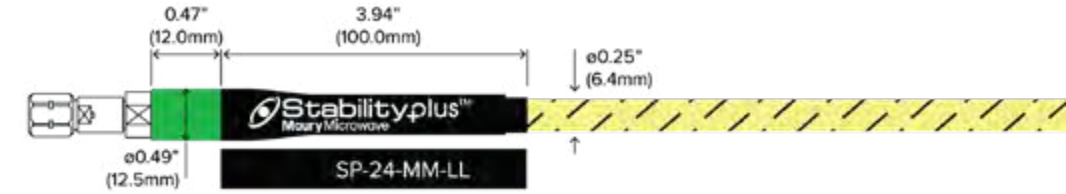
Average Power Handling

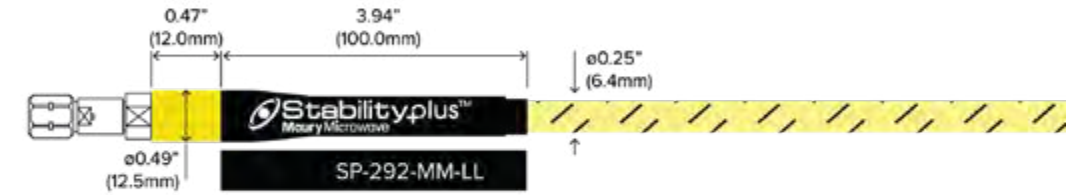
(1:1 VSWR, 25 C, Sea Level, Cable Only)

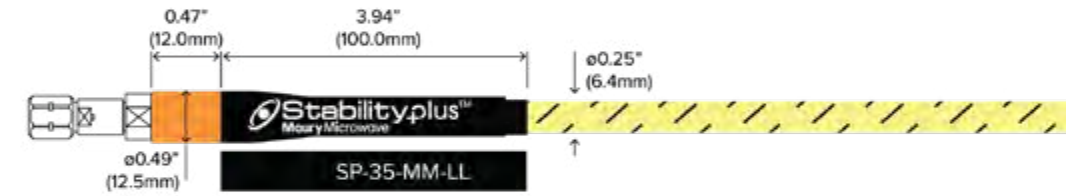
Freq (GHz)	SP-185 Watts (Max)	SP-24 Watts (Max)	SP-292 Watts (Max)	SP-35/SP-SMA Watts (Max)	SP-N/SP-7/SP-TNCA Watts (Max)
1	271	409	409	409	409
2	190	288	288	288	288
4	133	202	202	202	202
6	106	165	165	165	165
8	93	142	142	142	142
12	75	115	115	115	115
18	60	93	93	93	93
26.5	49	76	76	76	—
40	39	61	61	—	—
50	34	55	—	—	—
67	29	—	—	—	—

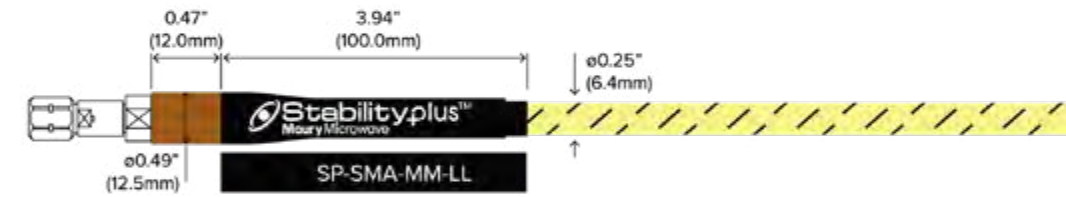
StabilityPlus™ Dimensions

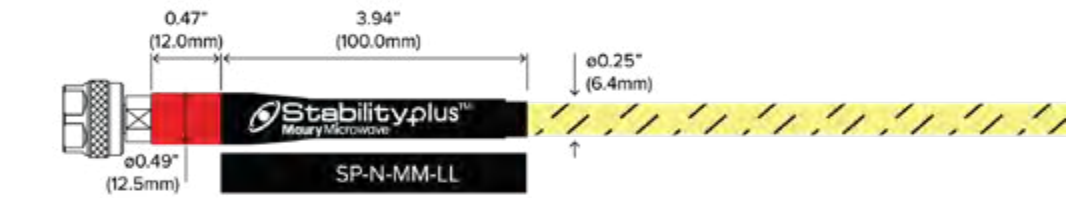


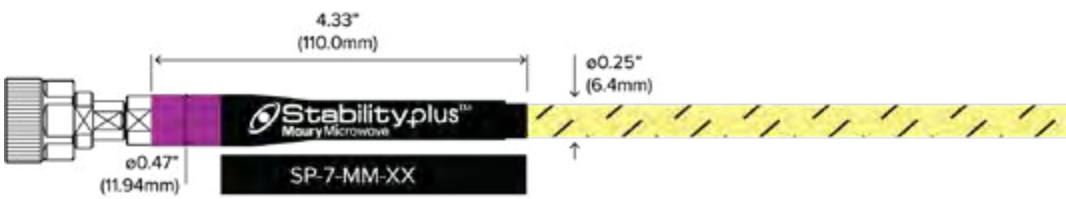


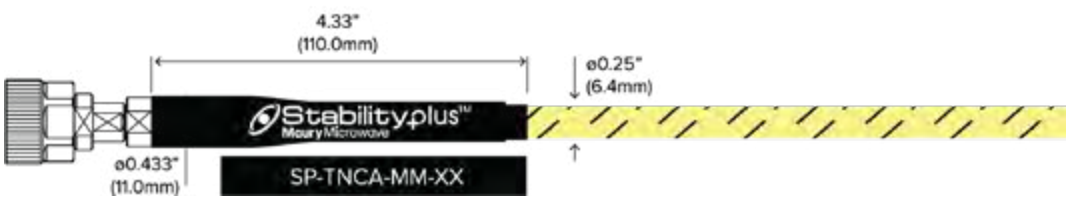










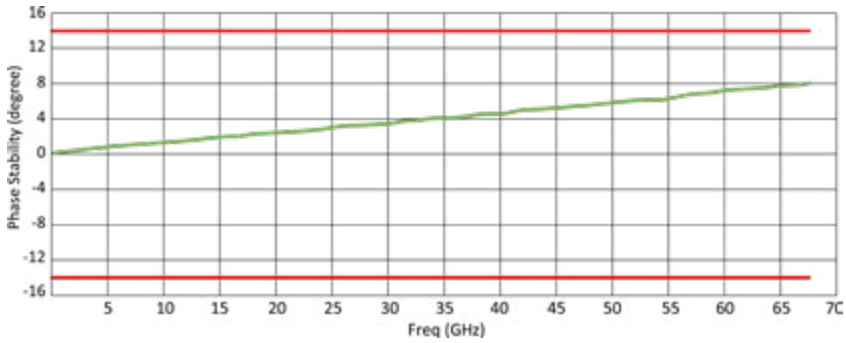


Phase Stability

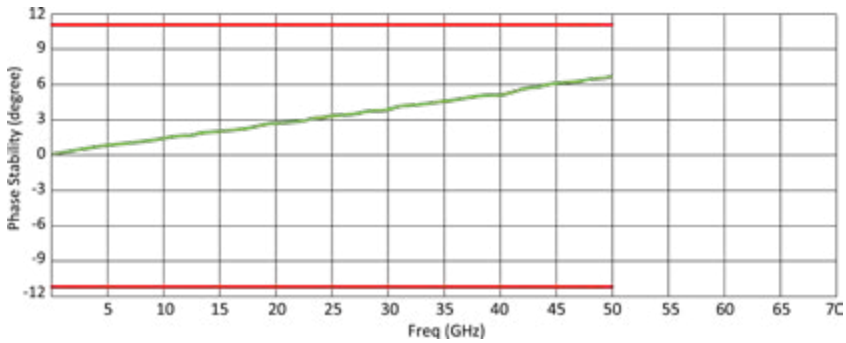
The maximum value for phase and amplitude stability was established using the following method. The cable was terminated with a short. With the cable in a straight position the VNA was normalized. The cable was coiled 360° around a mandrel 4 inches in diameter counter-clockwise and held in position for one sweep. The maximum deviation over the frequency range was recorded. The cable was then coiled 360° around the mandrel clockwise and held in position for one sweep and the maximum deviation was recorded. The cable was then returned to its original position for one sweep and the maximum deviation was recorded.

The plots on the right show the recorded worst-case phase variation.

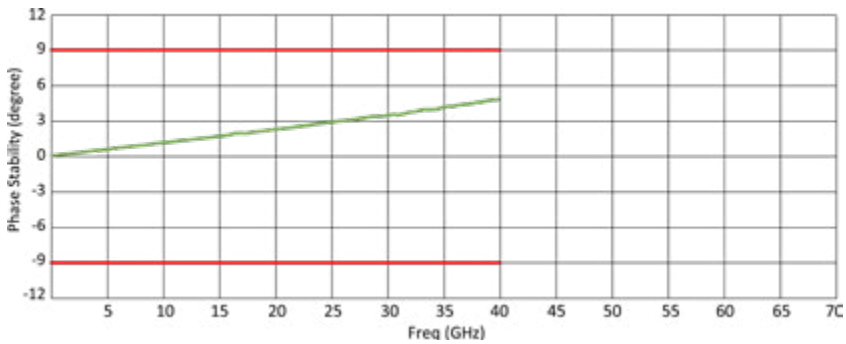
Exemplary data for SP-185-MM-36



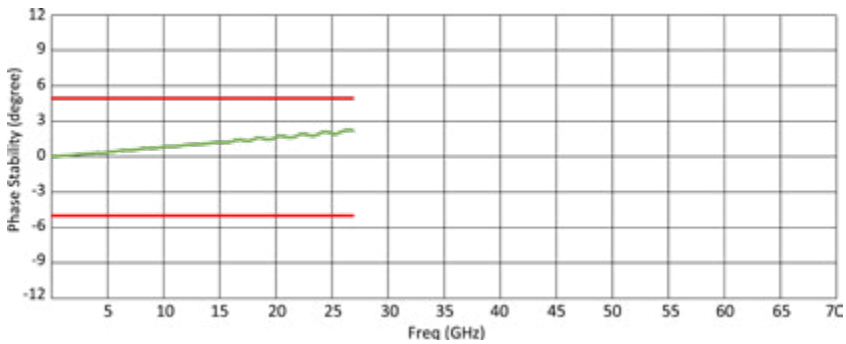
Exemplary data for SP-24-MM-36



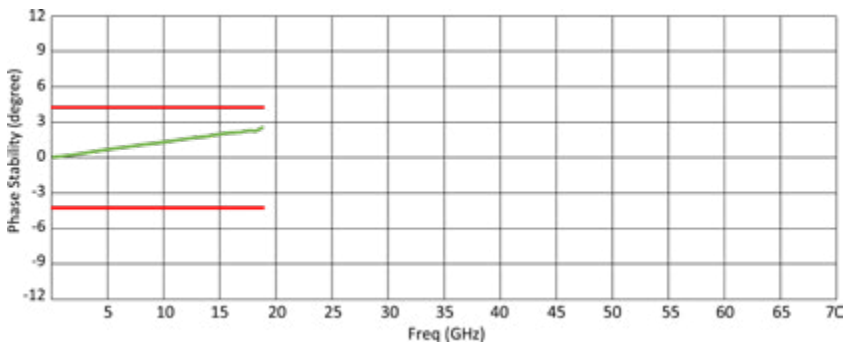
Exemplary data for SP-292-MM-36



Exemplary data for SP-35-MM-36/ SP-SMA-MM-36



Exemplary data for SP-N-MM-36/ SP-7-MM-36/ SP-TNCA-MM-36



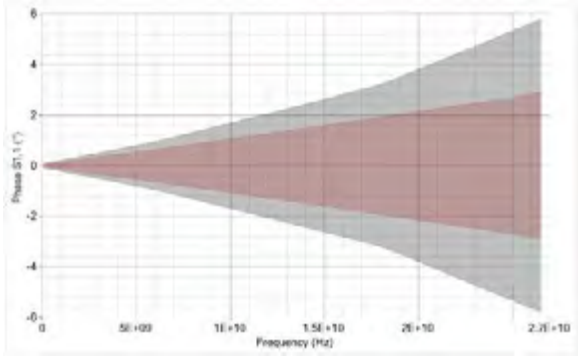
S-parameter measurements with uncertainty

A cable's *phase stability with flexure* specification is a metric used to communicate the impact of cable movement on a DUT measurement. It implies that lower specifications lessen the impact on the measurement (i.e. a cable with a 2° phase stability with flexure specification will have a lesser impact on a measurement than a cable with a 5° phase stability). However, the methods used to determine this specification may not be consistent across manufacturers, and likely do not represent the actual cable movement range of a user.

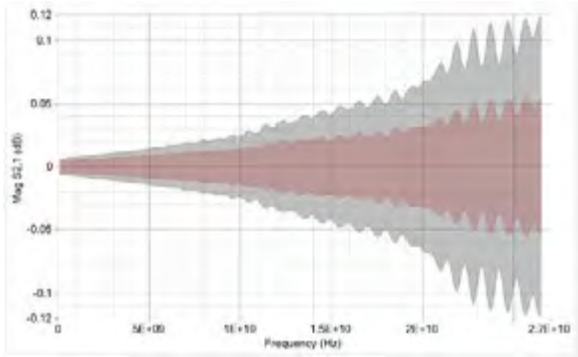
A better metric to understand a cable's impact on a DUT measurement is "uncertainty contribution". The cable's impact on measurement uncertainty can be calculated by moving the cable through a user's actual range of motion and recording the S-parameters across the movement. This technique has been thoroughly documented by the European Association of National Metrology Institutes (EURAMET)* and has been made commercially available in Maury's Insight™** calibration and measurement software platform.

The plots on the right show typical S-parameter measurements with uncertainty boundaries on different types of DUTs. The boundaries shown only consider the cable's direct contribution on measurement uncertainty.

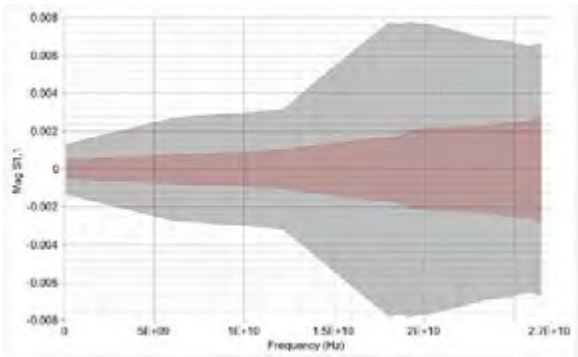
** https://www.maurymw.com/pdf/I-CAL-GUI-012.pdf*
*** https://www.maurymw.com/Precision/Insight_Software.php*



S11_phase measured on a short circuit termination
SP-35-MM-36 shown in red; leading global competitor shown in grey



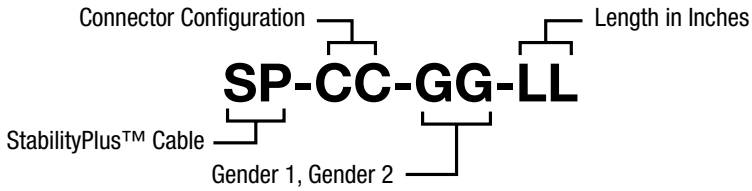
S21_mag measured on an airline
SP-35-MM-36 shown in red; leading global competitor shown in grey



S11_mag measured on a 50Ω termination
SP-35-MM-36 shown in red; leading global competitor shown in grey

Ordering Instructions for StabilityPlus™ Cable Assemblies

Standard StabilityPlus™ Cable Assemblies



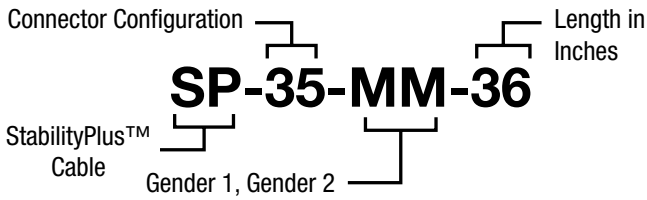
CC	GG	LL (Standard Lengths)
TNCA 7 (7mm) N (Type N)* SMA 35 (3.5mm) 292 (2.92mm) 24 (2.4mm) 185 (1.85mm)	MM (Male To Male) MF (Male to Female) FF (Female To Female) XX (Genderless to Genderless)** MX (Male to Genderless)** FX (Female to Genderless)**	24 36 48 60 78

** Type N available in male only.* *** Available for 7mm only.*

EXAMPLE:

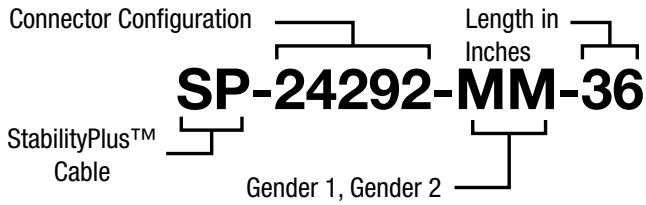
The following is a StabilityPlus™ cable assembly with 3.5mm male connectors on both ends, and 36 inches overall length.

Configuration Sample



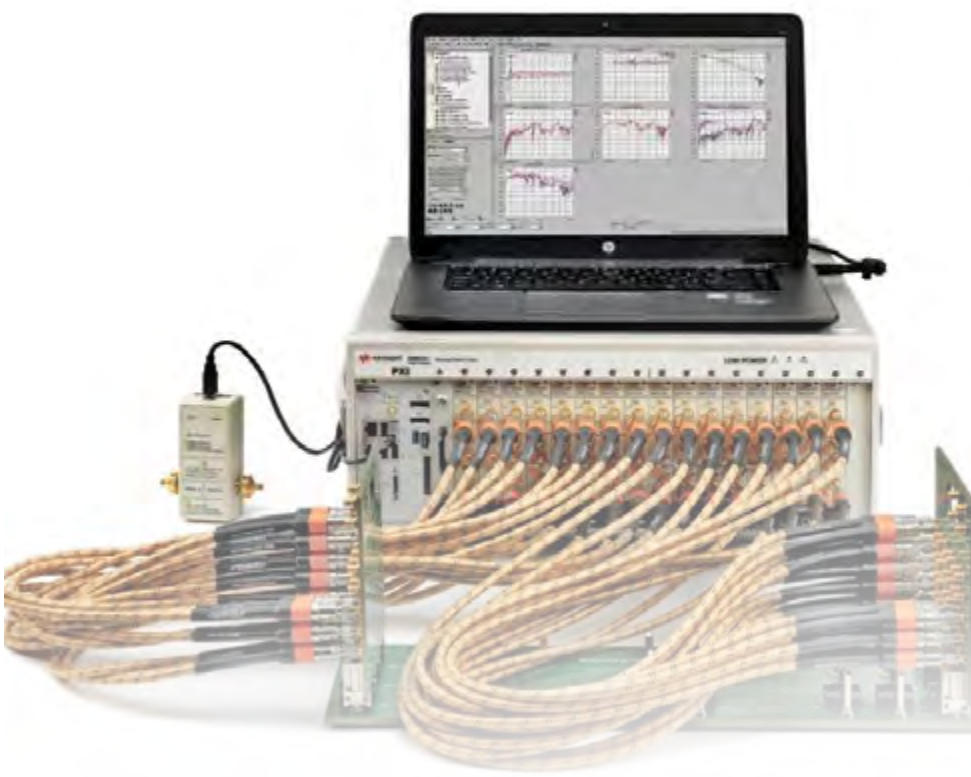
EXAMPLE:

The following is a StabilityPlus™ cable assembly with 2.4mm male connector on one end and 2.92mm male connector on the other end, and 36 inches overall length.



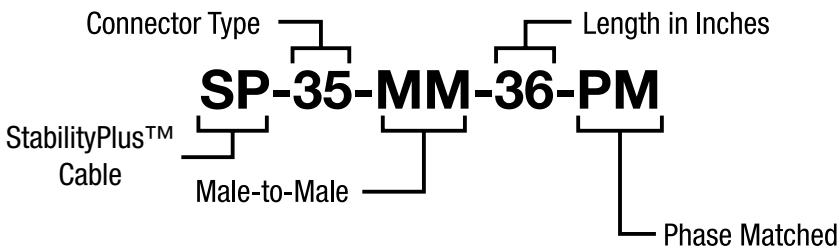
StabilityPlus™ Phase-Matched (PM) Cable Assembly Sets

StabilityPlus™ Phase-Matched Cable Assemblies have been designed for applications where strict phase equality between multiple paths are required. StabilityPlus™ PM Cable Assemblies are matched within ±0.5°/GHz and available as sets of two or more assemblies. StabilityPlus™ PM Cable Assemblies are offered in both standard and low-profile formats and maintain the mechanical and electrical characteristics of the original assembly. Phase-matched assemblies are available with 1.85mm, 2.4mm, 2.92mm, 3.5mm and Type-N connectors and in all lengths.



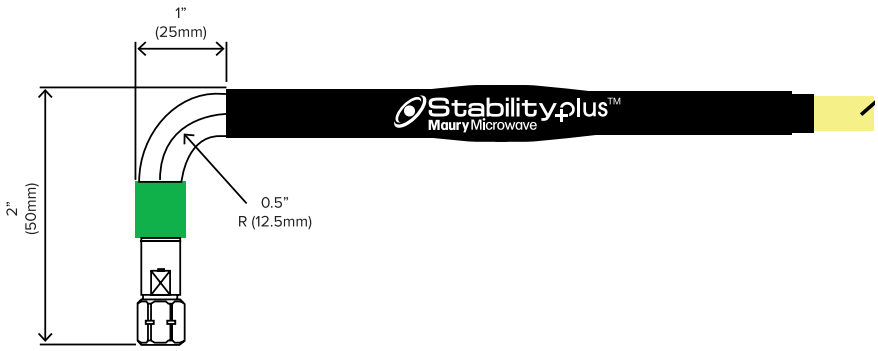
Ordering Instructions for StabilityPlus™ Phase-Matched (PM) Cable Assembly Sets

To specify a StabilityPlus™ Phase-Matched Cable Assembly set, add "PM" at the end of the SP model number, as shown in the example below. "PM" indicates standard configuration Phase-Matched sets.



StabilityPlus™ Cable Assemblies — Swept Right-Angle

StabilityPlus™ Cable Assemblies with swept right-angle connectors are designed for applications requiring a fixed and stable bend where traditional cable assemblies may be inconvenient. With a bend radius of 0.5 inches and a cable-to-connector length of 2 inches, right-angle connectors allow StabilityPlus™ Cable Assemblies to retain the electrical and mechanical specifications of the traditional assembly while removing stresses related to hand-formed bends. StabilityPlus™ assemblies with swept right-angle connectors are built on demand and are available with 1.85mm, 2.4mm, 2.92mm, 3.5mm and Type-N connectors.

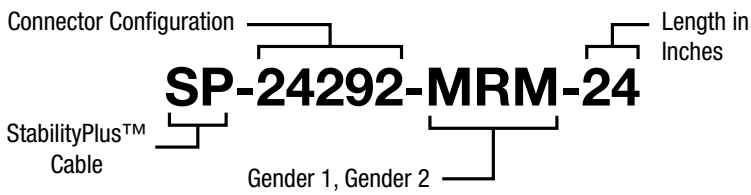


CC	G	LL
TNCA 7 (7mm) N (Type N) SMA 35 (3.5mm) 292 (2.92mm) 24 (2.4mm) 185 (1.85mm)	M (Male) MR (Male swept right-angle) F (Female) FR (Female swept right-angle) XR (Genderless swept right-angle)*	Custom length

** Available for 7mm only.*

Example:

The following is a StabilityPlus™ cable assembly with one 2.92mm male connector and one 2.4mm male swept right-angle connector, and 24 inches overall length.



StabilityPlus™ Low-Profile Microwave/RF Cable Assemblies

SERIES SP-185-LP , SP-24-LP, SP-292-LP, SP-35-LP, SP-SMA-LP, SP-N-LP, SP-7-LP, AND SP-TNCA-LP

Features and Benefits

- Stable and repeatable electrical performance
- Small profile for tight spacing requirements
- Flexible to facilitate easy installation
- Lightweight for use with smaller DUTs
- Color-coded connectors to avoid damage caused by connector mismates

Typical Applications

- Wafer probing
- Test bench systems
- RF and microwave instruments
- ATE systems
- Switch matrices
- R&D and prototyping

Description

Maury Microwave's StabilityPlus™ Low Profile Microwave/RF Cable Assemblies feature the same excellent electrical performance as our ruggedized StabilityPlus™ cables, but with a more compact and flexible design. StabilyPlus™ Low Profile cables provide excellent phase and amplitude stability with flexure resulting in highly reliable, repeatable measurements. They are ideal for applications that require lighter weight or tighter spacing such as wafer probing, ATE systems and switch matrices.

StabilityPlus™ cable assemblies are now part of the ColorConnect™ family! Following the proposed IEEE high-frequency connector/adapter color convention, StabilityPlus™ cable assemblies are the first commercially available assemblies 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 interconnects.

Stability™ Specifications

StabilityPlus™ Low-Profile Cable Type	Frequency	Typical Phase Stability with Flexure	Typical Amplitude Stability with Flexure
SP-185-LP	67 GHz	±6°	±0.05 dB
SP-24-LP	50 GHz	±4°	±0.05 dB
SP-292-LP	40 GHz	±2°	±0.02 dB
SP-35-LP	26.5 GHz	±2°	±0.02 dB
SP-SMA-LP	26.5 GHz	±2°	±0.02 dB
SP-N-LP	18 GHz	±2°	±0.02 dB
SP-7-LP	18 GHz	±2°	±0.02 dB
SP-TNCA-LP	18 GHz	±2°	±0.02 dB

PDF DATA SHEET 2Z-010

Standard Cable Assembly Specifications

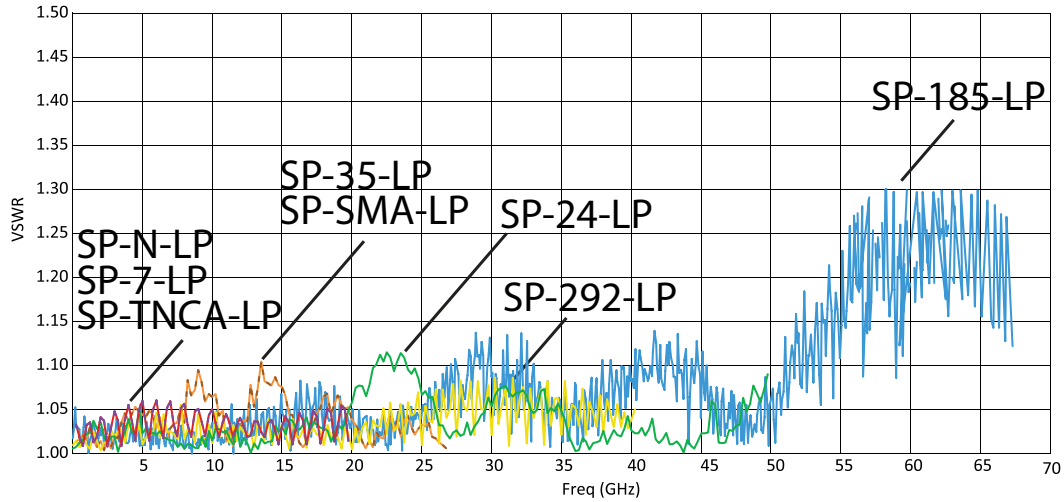
StabilityPlus™ Low-Profile Cable Type	SP-185 LP	SP-24 LP	SP-292 LP	SP-35 LP & SP-SMA LP	SP-N LP, SP-7 LP, & SP-TNCA LP
Maximum Frequency	67 GHz	50 GHz	40 GHz	26.5 GHz	18 GHz
VSWR (typical)	1.20:1	1.15:1	1.10:1		
Typical Insertion Loss (cable only)	1.79 dB/ft	1.00 dB/ft	0.89 dB/ft	0.72 dB/ft	0.61 dB/ft
Phase Stability vs Flexure (typical)	±6°	± 4°	± 2°		
Phase Stability vs Flexure (maximum)	±14°	± 10.5°	± 8.5°	± 5.5°	± 4.2°
Amplitude Stability vs Flexure (typical)	±0.15 dB	± 0.05 dB			
Amplitude Stability vs Flexure (maximum)	±0.20 dB	± 0.10 dB			
Phase Stability vs Temp	<4°/m/GHz (–55°+105°C)				
Impedance (nominal)	50 ohm				
Velocity of Propagation	74% (nominal)				
Shielding Effectiveness	>90 dB (DC - 18 GHz)				
Time Delay (nominal)	1.34 ns/ft (4.5 ns/m)				

Mechanical / Environmental Properties

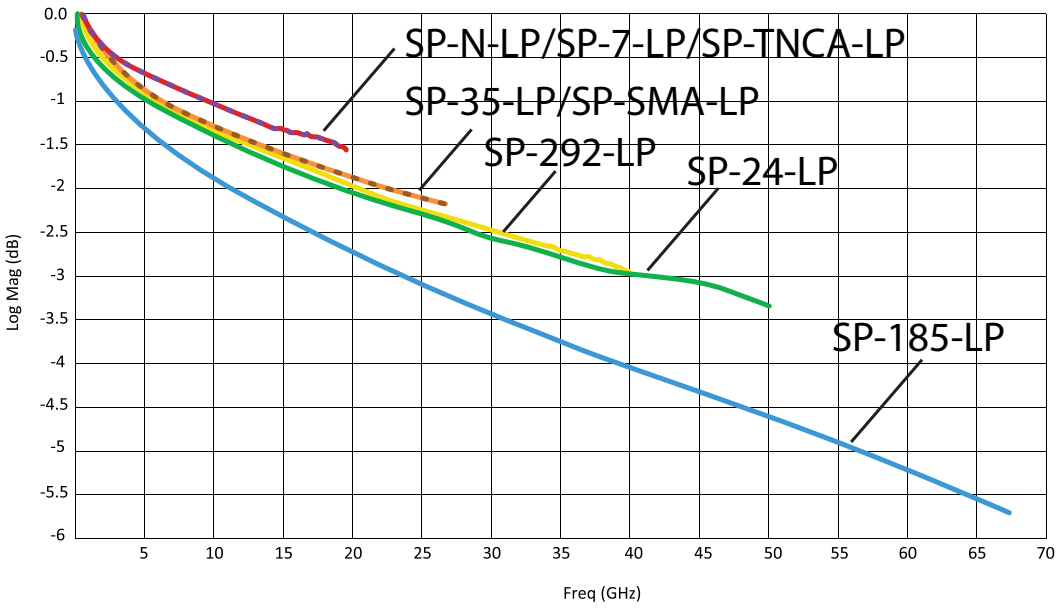
StabilityPlus™ Low-Profile Cable Type	SP-185-LP	SP-24-LP, SP-292-LP, SP-35-LP & SP-SMA-LP	SP-N LP	SP-7 LP	SP-TNCA LP
Center Conductor Material	Silver Plated Copper				
Maximum Outer Diameter (Connector)	0.37 in (9.5mm)	0.38 in (9.6mm)	0.870 in (22mm)	0.875 in (22.22mm)	0.64 in (16.25mm)
Maximum Outer Diameter (Cable)	0.1 in (2.6mm)	0.14 in (3.6mm)			
Nominal Weight	0.237 oz/ft (22g/m)	0.38 oz/ft (35g/m)			
Min. Static Bend Radius/ Min. Dynamic Bend Radius	0.51 in (13mm)/1.1 in (28mm)	0.55 in (14mm)/1.4 in (36mm)			
Flex Life Cycles	>15,000				
Connector Mating Cycles	>5,000				
Crush Resistance	>23 lbf/in (4 kgf/cm)				
Operating Temperature Range	–67°F to 221°F (–55°C to 105°C)				
RoHS/REACH	Yes				

Maury StabilityPlus™ Cable Assembly Typical Performance

Maury StabilityPlus™ Low-Profile 36" Cable Assembly Typical VSWR



Maury StabilityPlus™ Low-Profile 36" Cable Assembly Typical Insertion Loss



Max Insertion Loss/Attenuation

(1:1 VSWR, 25 C, Sea Level, Cable Only)

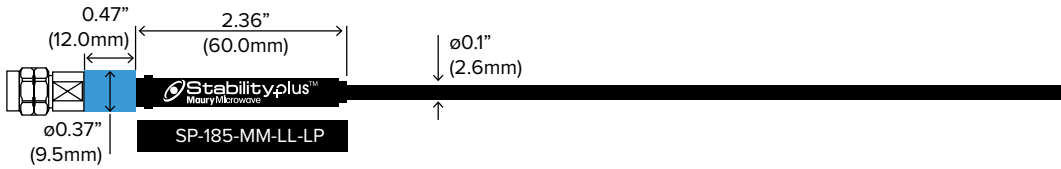
Freq (GHz)	SP-185-LP (dB/100 ft)	SP-24-LP (dB/100 ft)	SP-292-LP (dB/100 ft)	SP-35-LP (dB/100 ft)	SP-SMA-LP (dB/100 ft)	SP-N-LP (dB/100 ft)	SP-7-LP (dB/100 ft)	SP-TNCA-LP (dB/100 ft)
1	19.20	13.3	13.3	13.3	13.3	13.3	13.3	13.3
2	27.37	19.00	19.00	19.00	19.00	19.00	19.00	19.00
4	39.14	27.00	27.00	27.00	27.00	27.00	27.00	27.00
6	48.35	33.20	33.20	33.20	33.20	33.20	33.20	33.20
8	56.23	38.40	38.40	38.40	38.40	38.40	38.40	38.40
12	69.70	47.40	47.40	47.40	47.40	47.40	47.40	47.40
18	86.57	58.50	58.50	58.50	58.50	58.50	58.50	58.50
26.5	106.77	71.60	71.60	71.60	71.60	—	—	—
40	133.94	88.90	88.90	—	—	—	—	—
50	151.70	100.10	—	—	—	—	—	—
67	179.00	—	—	—	—	—	—	—

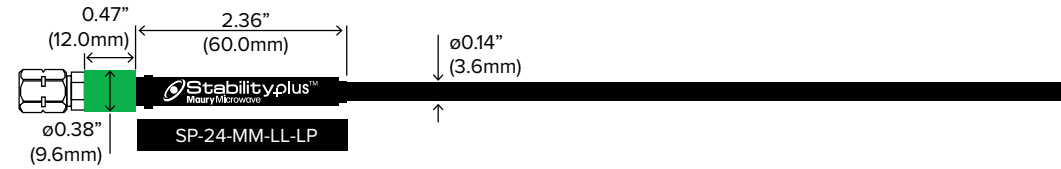
Average Power Handling

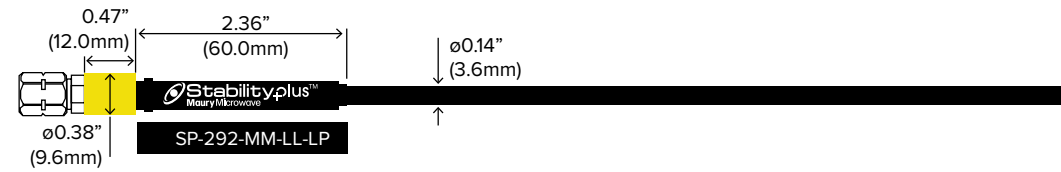
(1:1 VSWR, 25 C, Sea Level, Cable Only)

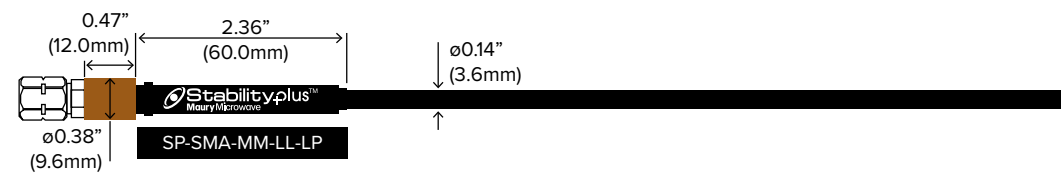
Freq (GHz)	SP-185-LP Watts (Max)	SP-24-LP Watts (Max)	SP-292-LP Watts (Max)	SP-35-LP Watts (Max)	SP-SMA-LP Watts (Max)	SP-N-LP Watts (Max)	SP-7-LP Watts (Max)	SP-TNCA-LP Watts (Max)
1	271	409	409	409	409	409	409	409
2	190	288	288	288	288	288	288	288
4	133	202	202	202	202	202	202	202
6	108	165	165	165	165	165	165	165
8	93	142	142	142	142	142	142	142
12	75	115	115	115	115	115	115	115
18	60	93	93	93	93	93	93	93
26.5	49	76	76	76	76	—	—	—
40	39	61	61	—	—	—	—	—
50	34	55	—	—	—	—	—	—
67	29	—	—	—	—	—	—	—

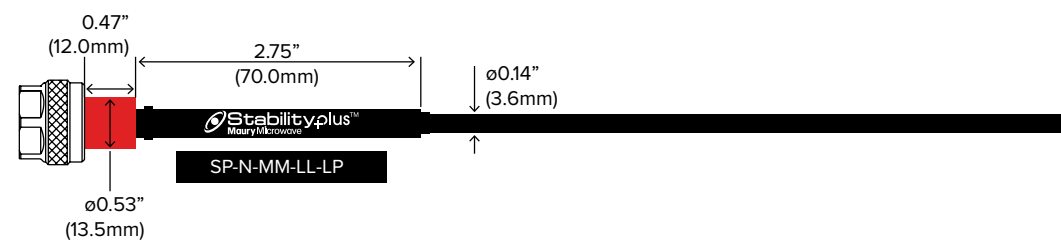
StabilityPlus™ Low Profile Dimensions

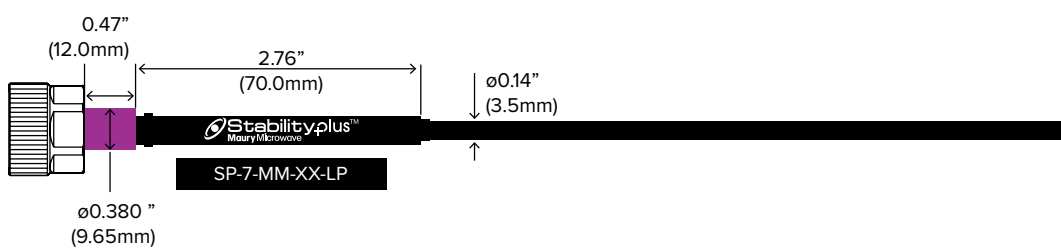


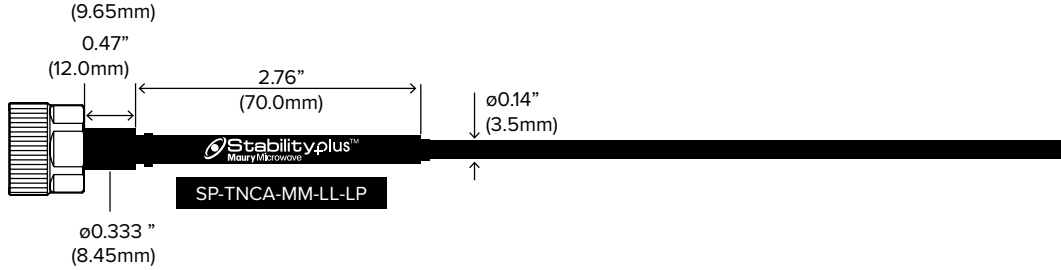










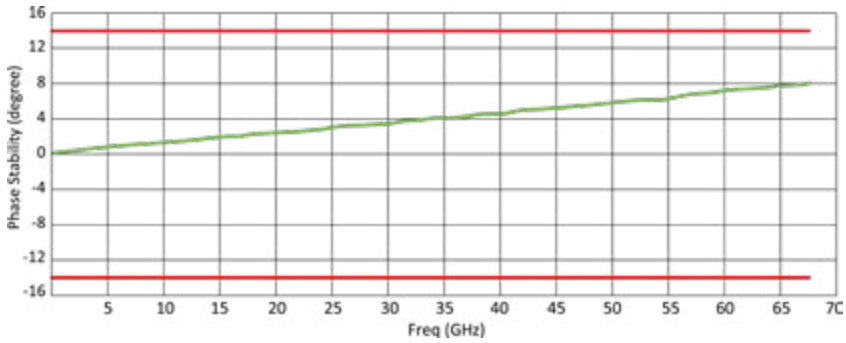


Phase Stability

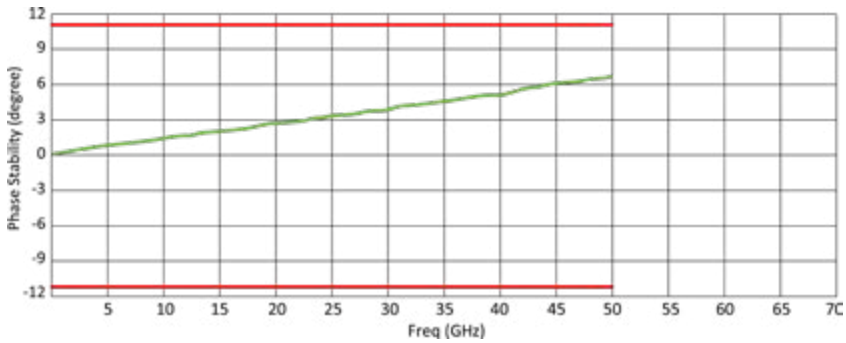
The maximum value for phase and amplitude stability was established using the following method. The cable was terminated with a short. With the cable in a straight position the VNA was normalized. The cable was coiled 360° around a mandrel 4 inches in diameter counter-clockwise and held in position for one sweep. The maximum deviation over the frequency range was recorded. The cable was then coiled 360° around the mandrel clockwise and held in position for one sweep and the maximum deviation was recorded. The cable was then returned to its original position for one sweep and the maximum deviation was recorded.

The plots on the right show the recorded worst-case phase variation.

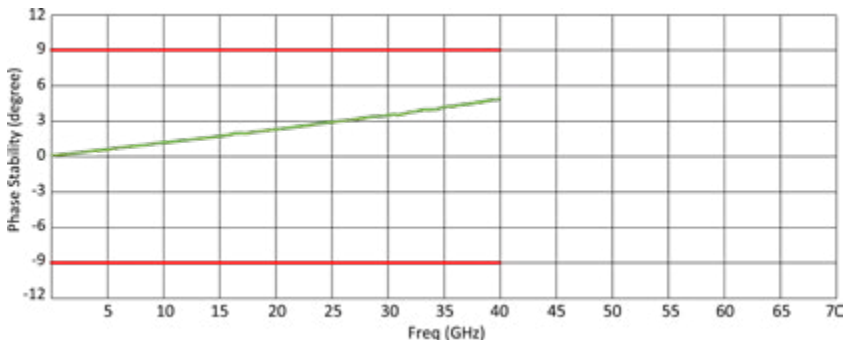
Exemplary data for SP-185-MM-36



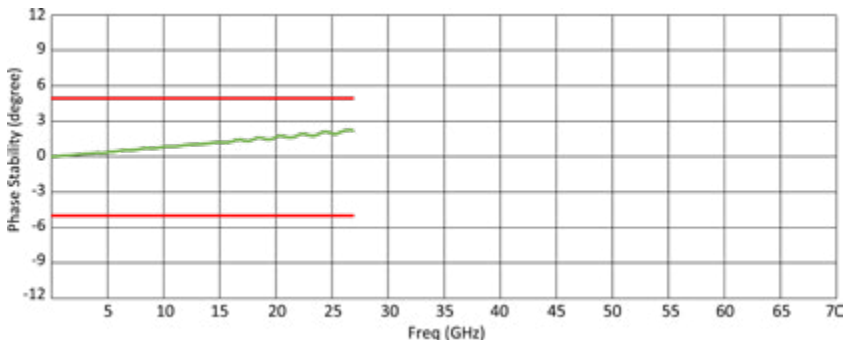
Exemplary data for SP-24-MM-36-LP



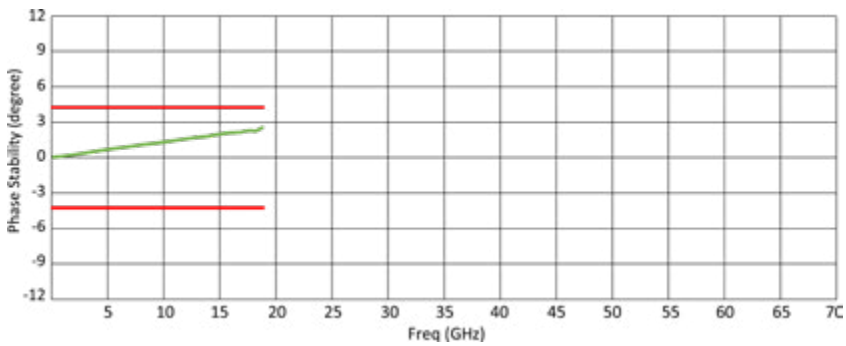
Exemplary data for SP-292-MM-36-LP



Exemplary data for SP-35-MM-36-LP/ SP-SMA-MM-36-LP



Exemplary data for SP-N-MM-36-LP/ SP-7-MM-36-LP/ SP-TNCA-MM-36-LP



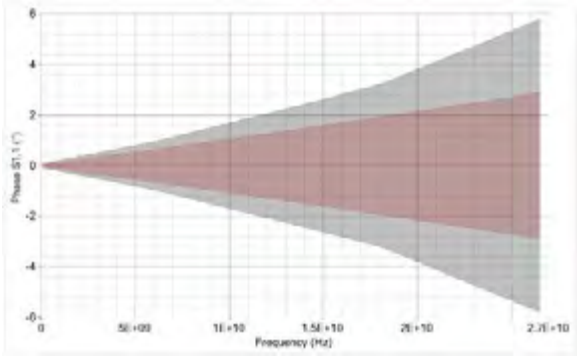
S-parameter measurements with uncertainty

A cable's *phase stability with flexure* specification is a metric used to communicate the impact of cable movement on a DUT measurement. It implies that lower specifications lessen the impact on the measurement (i.e. a cable with a 2° phase stability with flexure specification will have a lesser impact on a measurement than a cable with a 5° phase stability). However, the methods used to determine this specification may not be consistent across manufacturers, and likely do not represent the actual cable movement range of a user.

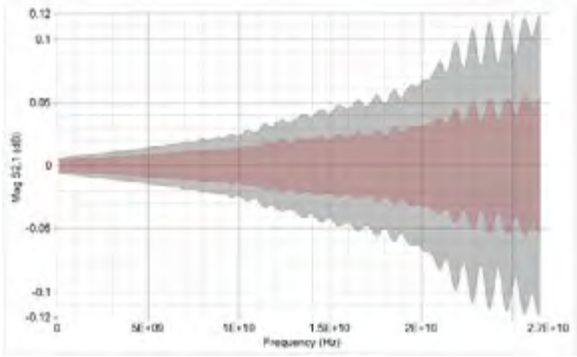
A better metric to understand a cable's impact on a DUT measurement is "uncertainty contribution". The cable's impact on measurement uncertainty can be calculated by moving the cable through a user's actual range of motion and recording the S-parameters across the movement. This technique has been thoroughly documented by the European Association of National Metrology Institutes (EURAMET)* and has been made commercially available in Maury's Insight™** calibration and measurement software platform.

The plots on the right show typical S-parameter measurements with uncertainty boundaries on different types of DUTs. The boundaries shown only consider the cable's direct contribution on measurement uncertainty.

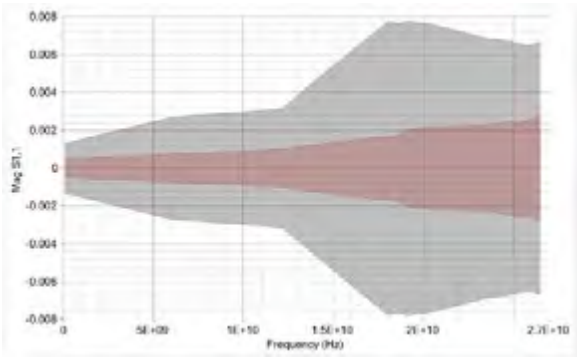
** https://www.maurymw.com/pdf/I-CAL-GUI-012.pdf*
*** https://www.maurymw.com/Precision/Insight_Software.php*



S11_phase measured on a short circuit termination
SP-35-MM-36-LP shown in red; leading global competitor shown in grey



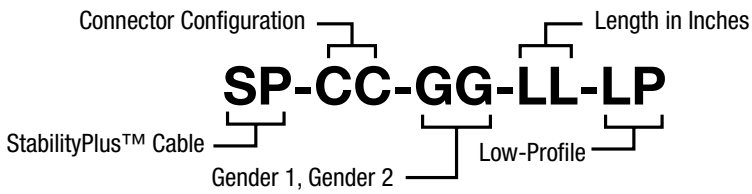
S21_mag measured on an airline
SP-35-MM-36-LP shown in red; leading global competitor shown in grey



S11_mag measured on a 50Ω termination
SP-35-MM-36-LP shown in red; leading global competitor shown in grey

Ordering Instructions for StabilityPlus™ Low-Profile Cable Assemblies

Standard StabilityPlus™ Low-Profile Cable Assemblies

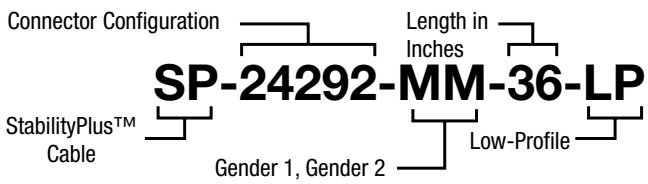


CC	GG	LL (Standard Lengths)	Low-Profile
TNCA 7 (7mm) N (Type N)* SMA 35 (3.5mm) 292 (2.92mm) 24 (2.4mm) 185 (1.85mm)	MM (Male To Male) MF (Male to Female) FF (Female To Female) XX (Genderless to Genderless)** MX (Male to Genderless)** FX (Female to Genderless)**	24 36 48 60 78	LP (Low-Profile)

** Type N available in male only* *** Available for 7mm only.*

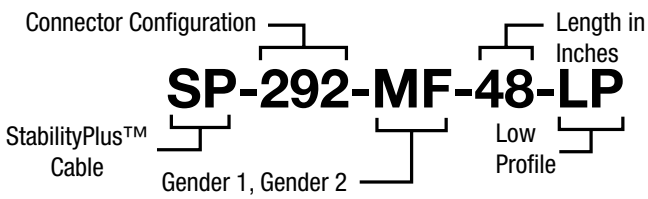
EXAMPLE:

The following is a StabilityPlus™ Low-Profile cable assembly with 2.4mm male connector on one end and 2.92mm male connector on the other end, and 36 inches overall length.



EXAMPLE:

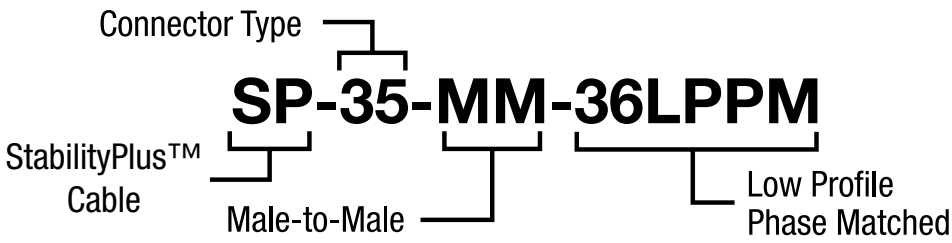
The following is a StabilityPlus™ Low Profile cable assembly with 2.92mm male connector on one end and female connector on the other end, and 48 inches overall length.



StabilityPlus™ Phase-Matched (PM) Cable Assembly Sets

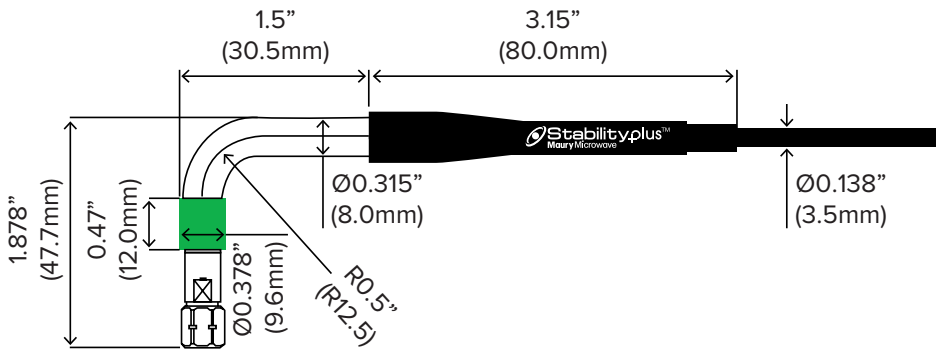
StabilityPlus™ Phase-Matched Cable Assemblies have been designed for applications where strict phase equality between multiple paths are required. StabilityPlus™ PM Cable Assemblies are matched within ±0.5°/GHz and available as sets of two or more assemblies. StabilityPlus™ PM Cable Assemblies are offered in both standard and low-profile formats and maintain the mechanical and electrical characteristics of the original assembly. Phase-matched assemblies are available with 1.85mm, 2.4mm, 2.92mm, 3.5mm and Type-N connectors and in all lengths.

To specify a StabilityPlus™ Phase-Matched Cable Assembly set, add "PM" or "LPPM" at the end of the SP model number, as shown in the example below. "PM" indicates standard configuration Phase-Matched sets; "LPPM" indicates Low Profile configuration, Phase-Matched sets.



StabilityPlus™ Low-Profile Cable Assemblies — Swept Right-Angle

StabilityPlus™ Low-Profile Cable Assemblies with swept right-angle connectors are designed for applications requiring a fixed and stable bend where traditional cable assemblies may be inconvenient. With a bend radius of 0.5 inches and a cable-to-connector length of 2 inches, right-angle connectors allow StabilityPlus™ Low-Profile Cable Assemblies to retain the electrical and mechanical specifications of the traditional assembly while removing stresses related to hand-formed bends. StabilityPlus™ Low-Profile assemblies with swept right-angle connectors are built on demand and are available with 1.85mm, 2.4mm, 2.92mm, 3.5mm and Type-N connectors.

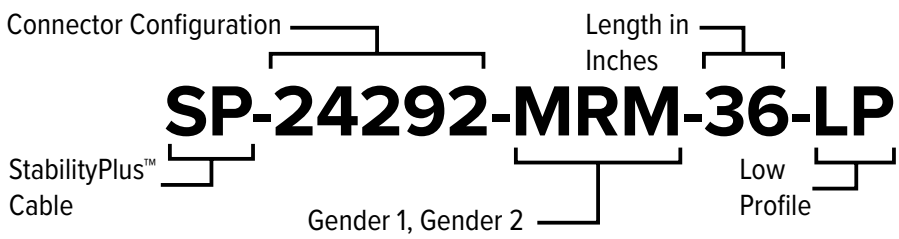


CC	G	LL
TNCA 7 (7mm) N (Type N) SMA 35 (3.5mm) 292 (2.92mm) 24 (2.4mm) 185 (1.85mm)	M (Male) MR (Male swept right-angle) F (Female) FR (Female swept right-angle) XR (Genderless swept right-angle)*	Custom length

** Available for 7mm only.*

Example:

The following is a StabilityPlus™ Low-Profile cable assembly with one 2.92mm male connector and one 2.4mm male swept right-angle connector, and 36 inches overall length.



StabilityFlex™ Microwave/RF Cable Assemblies

SERIES SF-N, SF-SMA, SF-N-LP, SF-SMA-LP

Features and Benefits

- Excellent value
- Low insertion loss
- Reliable and repeatable measurements
- Amplitude and phase stable with flexure
- High mating-cycle durability

Typical Applications

- RF and microwave instruments
- Bench-top testing
- Probe station integrations
- RF production testing
- Component/module testing
- ATE systems

Description

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

StabilityFlex™ cable assemblies are now part of the ColorConnect™ family! Following the proposed IEEE high-frequency connector/adapter color convention, StabilityFlex™ cable assemblies are the first commercially available assemblies 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 interconnects.

Cable Assembly Specifications

Electrical Properties

StabilityFlex™ Cable Type	SF-24	SF-24-LP	SF-292	SF-292-LP	SF-SMA	SF-SMA-LP	SF-N	SF-N-LP
Maximum Frequency GHz	50		40		26.5		18	
VSWR (typical)	1.30:1		1.25:1					
Typical Insertion Loss (cable only)"	1.49 dB/ft		1.31 dB/ft		0.77 dB/ft		0.60 dB/ft	
Impedance (nominal)	50 ohm							
Phase Stability vs Flexure (typical)	±8°		±6°		±4°		±3°	
Amplitude Stability vs Flexure (typical)	±0.08°		±0.05 dB					
Velocity of Propagation	74% (nominal)							
Shielding Effectiveness	> 90 dB (DC-18 GHz)							
Time Delay (nominal)	1.37 ns/ft (4.5 ns/m)							

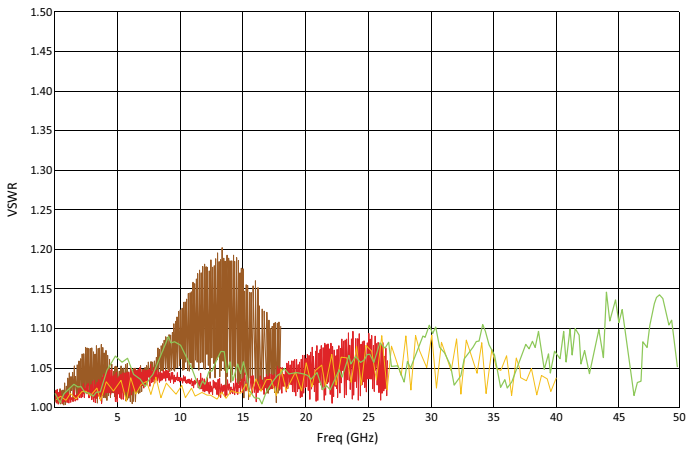
Mechanical / Environmental Properties

StabilityFlex™ Cable Type	SF-24	SF-24-LP	SF-292	SF-292-LP	SF-SMA	SF-SMA-LP	SF-N	SF-N-LP
Center Conductor Material	Stranded Silver Plated Copper							
"Maximum Outer Diameter (Connector)"	0.38 in (9.8 mm)						0.86 in (21.9 mm)	
"Maximum Outer Diameter (Cable)"	0.4 in (10.2 mm)	0.16 in (4.06 mm)	0.4 in (10.2 mm)	0.16 in (4.06 mm)	0.4 in (10.2 mm)	0.21 in (5.35 mm)	0.4 in (10.2 mm)	0.21 in (5.35 mm)
Nominal Weight	170 g/m (1.83 Oz/ft)	30 g/m (0.32 Oz/ft)	170 g/m (1.83 Oz/ft)	30 g/m (0.32 Oz/ft)	190 g/m (2.04 Oz/ft)	50 g/m (0.54 Oz/ft)	190 g/m (2.04 Oz/ft)	50 g/m (0.54 Oz/ft)
Min. Static Bend Radius	1.97 in (50.0 mm)	0.63 in (16.0 mm)	1.97 in (50.0 mm)	0.63 in (16.0 mm)	1.97 in (50.0 mm)	0.63 in (16.0 mm)	1.97 in (50.0 mm)	0.63 in (16.0 mm)
Min. Dynamic Bend Radius	3.94 in (100.0 mm)	1.97 in (50.0 mm)	3.94 in (100.0 mm)	1.97 in (50.0 mm)	3.94 in (100.0 mm)	1.97 in (50.0 mm)	3.94 in (100.0 mm)	1.97 in (50.0 mm)
Flex Life Cycles	>10,000							
Crush Resistance	440 lbf/in (78 Kgf/cm)	80 lbf/in (14 Kgf/cm)	440 lbf/in (78 Kgf/cm)	80 lbf/in (14 Kgf/cm)	440 lbf/in (78 Kgf/cm)	80 lbf/in (14 Kgf/cm)	440 lbf/in (78 Kgf/cm)	80 lbf/in (14 Kgf/cm)
Operating Temperature Range	-67°+121 °F(-55°+85°C)							
RoHS/REACH	Yes							

Maury StabilityFlex™ Cable Assembly Typical Performance

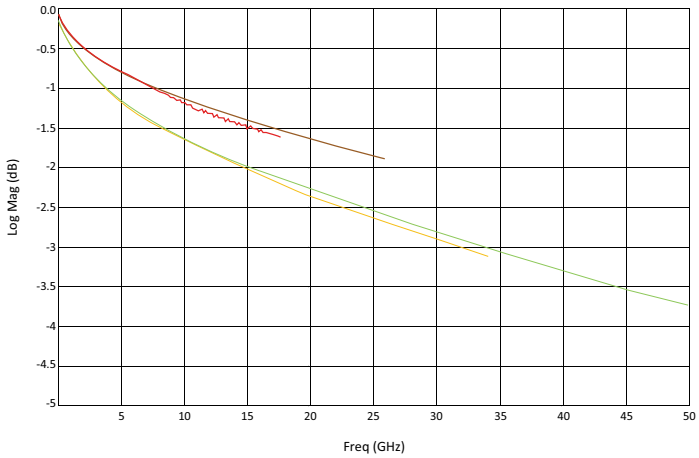
Maury StabilityFlex™ 36" Cable Assembly Typical VSWR

SF-24 SF-292 SF-N SF-SMA



Maury StabilityFlex™ 36" Cable Assembly Typical Insertion Loss

SF-24 SF-292 SF-N SF-SMA



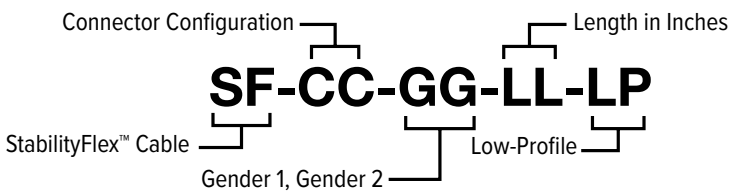
CC	GG	LL (Standard Lengths)**	Options
N (Type N)* SMA 292 (2.92mm) 24 (2.4mm)	MM (Male To Male) MF (Male to Female) FF (Female To Female)	24 36 48 60 78	Low-Profile

** Type N available in male only.*

*** StabilityFlex™ Low-Profile cable assemblies only; standard profile by special order*

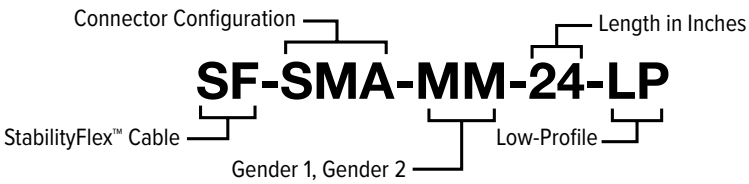
Ordering Instructions for StabilityFlex™ Cable Assemblies

Standard StabilityFlex™ Cable Assemblies



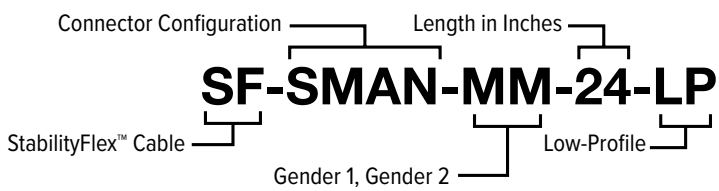
EXAMPLE:

The following is a StabilityFlex™ Low-Profile cable assembly with SMA male connectors on both ends, 24 inches in overall length, and low-profile option.



EXAMPLE:

The following is a StabilityFlex™ Low-Profile cable assembly with SMA male connecter on one end and Type N connector on the other end, 24 inches overall length, and low-profile option.



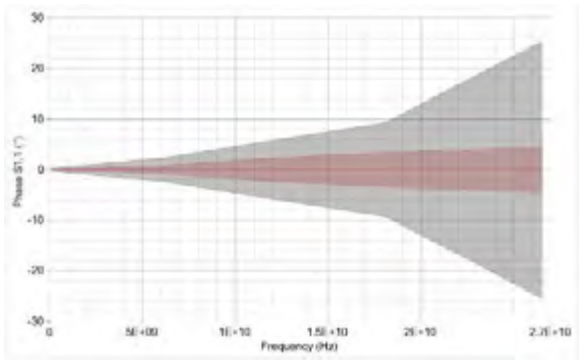
S-parameter measurements with uncertainty

A cable's *phase stability with flexure* specification is a metric used to communicate the impact of cable movement on a DUT measurement. It implies that lower specifications lessen the impact on the measurement (i.e. a cable with a 2° phase stability with flexure specification will have a lesser impact on a measurement than a cable with a 5° phase stability). However, the methods used to determine this specification may not be consistent across manufacturers, and likely do not represent the actual cable movement range of a user.

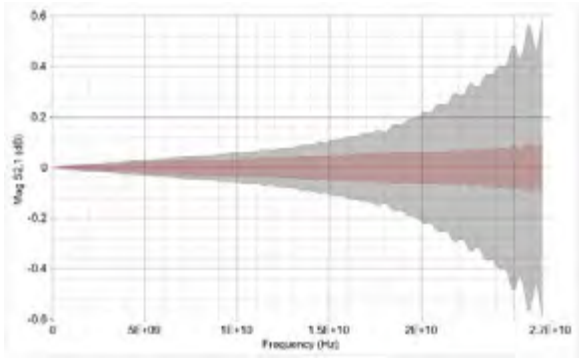
A better metric to understand a cable's impact on a DUT measurement is "uncertainty contribution". The cable's impact on measurement uncertainty can be calculated by moving the cable through a user's actual range of motion and recording the S-parameters across the movement. This technique has been thoroughly documented by the European Association of National Metrology Institutes (EURAMET)* and has been made commercially available in Maury's Insight™** calibration and measurement software platform.

The plots on the right show typical S-parameter measurements with uncertainty boundaries on different types of DUTs. The boundaries shown only consider the cable's direct contribution on measurement uncertainty.

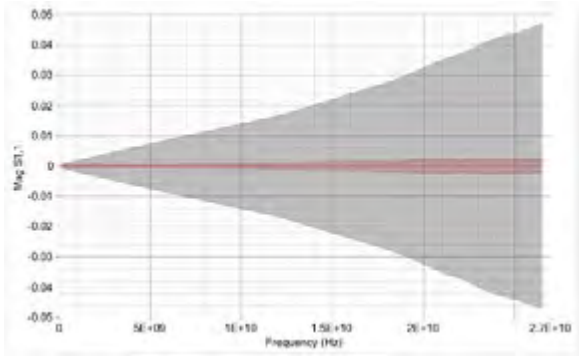
** https://www.maurymw.com/pdf/I-CAL-GUI-012.pdf*
*** https://www.maurymw.com/Precision/Insight_Software.php*



S11_phase measured on a short circuit termination SF-SMA-MM-36 shown in red; leading global competitor shown in grey



S21_mag measured on a short circuit termination SF-SMA-MM-36 shown in red; leading global competitor shown in grey



S11_mag measured on a short circuit termination SF-SMA-MM-36 shown in red; leading global competitor shown in grey

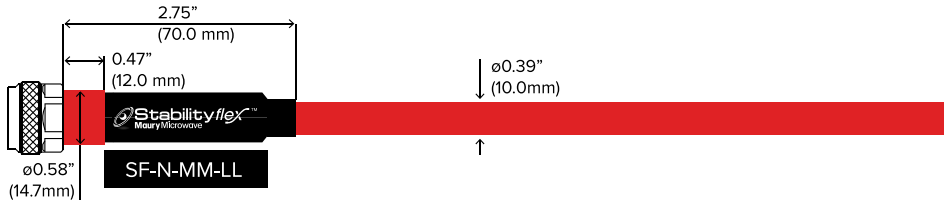
Typical Insetion Loss/Attenuation (1:1 VSWR, 25 C, Sea Level, Cable Only)v

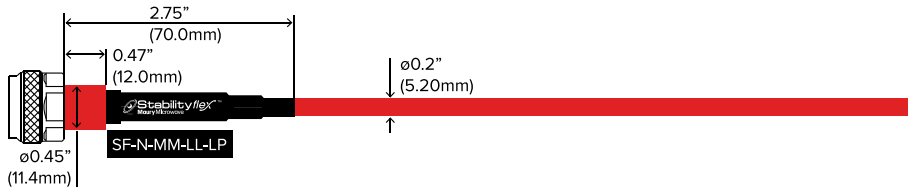
Freq (GHz)	SF-SMA & SF-SMA-LP (dB/100 ft)	SF-N & SF-N-LP (dB/100 ft)
1	11.73	11.73
2	17.04	17.04
4	25.00	25.00
6	31.47	31.47
8	37.16	37.16
12	47.21	47.21
18	60.37	60.37
26.5	76.85	N/A

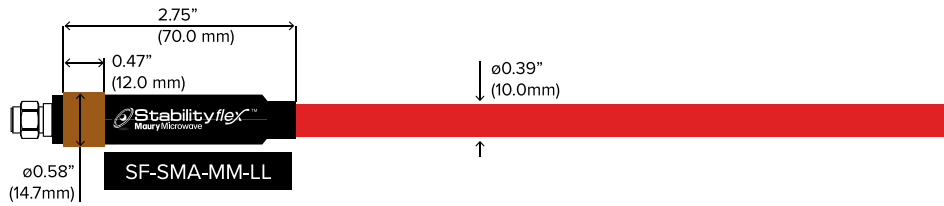
Average Power Handling (1:1 VSWR, 25 C, Sea Level, Cable Only)

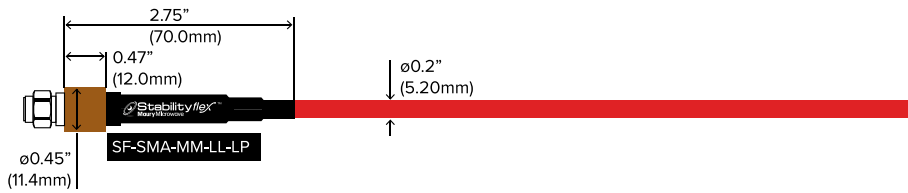
Freq (GHz)	SF-SMA & SF-SMA-LP Watts (Max)"	SF-N & SF-N-LP Watts (Max)
1	149	149
2	102	102
4	70	70
6	55	55
8	47	47
12	37	37
18	29	29
26.5	23	N/A

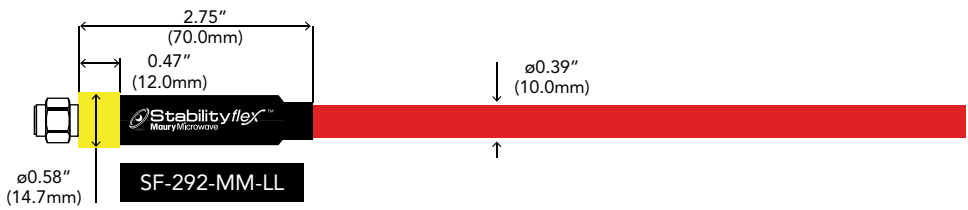
StabilityFlex™ Dimensions

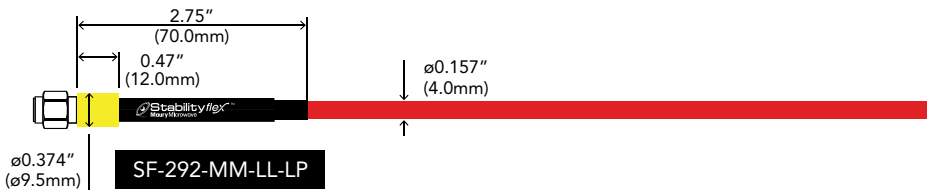


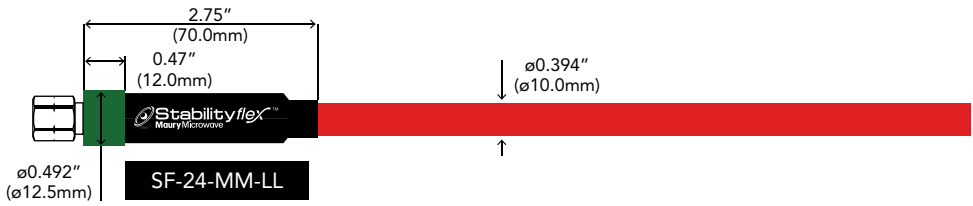


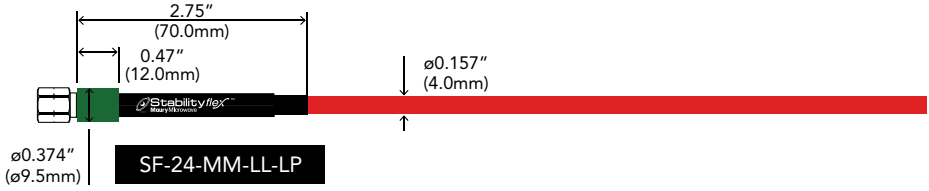












StabilityTVAC™ Cable Assemblies

Features and Benefits

- Low outgassing
- Vented connectors
- Thermally conditioned
- Phase stable with flexure
- High power handling
- Low insertion loss

Typical Applications

- TVAC test chambers

Description

Thermal Vacuum (TVAC) chambers are used by space component manufacturers to test components, sub-systems and even entire satellites under space-like conditions. It is essential that the T&M components, including cable assemblies, used to test the device-under-test (DUT) inside the chamber be specifically designed to accommodate the effects of pressure and temperature created within the TVAC chamber.

Outgassing is the process whereby varying temperature and vacuum conditions cause materials to release free volatiles, which can deposit on other components in a test system and cause significant contamination. StabilityTVAC™ assemblies use low outgassing materials which meet the requirements of ASTM E-595 with a TML < 1% and CVCM < 0.1%.

Changes in vacuum conditions force air in and out of cable assemblies, which can cause damage if not properly accounted for. Standard connectors require a slower change in pressure or risk damage. StabilityTVAC™ uses vented connectors which allow air to escape much faster, thereby empowering cable assemblies to stabilize and be used with minimal delays, and tests to be performed using rapid pressurization/depressurization cycles.

Like most mechanical components, cable assemblies expand and contract when presented with varying temperatures, which can cause changes in performance and even a permanent degradation. StabilityTVAC™ cable assemblies are thermally conditioned, going through aging and stabilization to relieve mechanical stresses for reliable performance over temperature.

Standard Cable Assembly Specifications

StabilityTVAC™ Cable Type	TV-292	TV-292-LP	TV-SMA	TV-SMA-LP	TV-TNCA	TV-TNCA-LP
Maximum Frequency	40 GHz		26.5 GHz		18 GHz	
VSWR (typical)	1.25					
VSWR (maximum)	1.30					
Typical Insertion Loss (cable only)	0.672 dB/ft		0.537 dB/ft		0.436 dB/ft	
Impedance (nominal)	50 ohm					
Phase Stability vs Flexure (typical)	±4.5°		±2°			
Amplitude Stability vs Flexure (typical)	±0.05 dB					
Phase Stability vs Temp	≤600PM (-55°C to 85°C)					
Velocity of Propagation	82% (nominal)					
Shielding Effectiveness	> 90 dB (DC - 18 GHz)					
Time Delay (nominal)	1.24 ns/ft (4.07 ns/m)					
Dielectric Withstanding Voltage	750V					

Mechanical / Environmental Properties

StabilityTVAC™ Cable Type	TV-292	TV-292-LP	TV-SMA	TV-SMA-LP	TV-TNCA	TV-TNCA-LP
Center Conductor Material	Silver Plated Copper					
Maximum Outer Diameter (Connector)	0.35 in (9mm)	0.35 in (9mm)	0.35 in (9mm)	0.35 in (9mm)	0.622 in (15.8mm)	0.622 in (15.8mm)
Maximum Outer Diameter (Cable)	0.256 in (6.5mm)	0.15 in (3.8mm)	0.256 in (6.5mm)	0.15 in (3.8mm)	0.256 in (6.5mm)	0.15 in (3.8mm)
Nominal Weight (Cable)	.34 oz/ft (32 g/m)					
Min. Static Bend Radius (Inch) / Min. Dynamic Bend Radius (Inch)	1.283 in / 2.56 in	0.748 in / 1.5 in	1.283 in / 2.56 in	0.748 in / 1.5 in	1.283 in / 2.56 in	0.748 in / 1.5 in
Flex Life Cycles	>500					
Crush Resistance	250 lbf/in (44 kgf/cm)	27 lbf/in (4.8 kgf/cm)	250 lbf/in (44 kgf/cm)	27 lbf/in (4.8 kgf/cm)	250 lbf/in (44 kgf/cm)	27 lbf/in (4.8 kgf/cm)
Operating Temperature Range	-67°F to 329°F (-55°C to 165°C)					
RoHS/REACH	Yes					
Outgassing	TML<1%, CVCM< 0.1%					

Max Insertion Loss/Attenuation

Freq (GHz)	TV-292 (db/100 ft)	TV-292-LP (db/100 ft)	TV-SMA (db/100 ft)	TV-SMA-LP (db/100 ft)	TV-TNCA (db/100 ft)	TV-TNCA-LP (db/100 ft)
0.5	6.8		6.8			
1	9.7		9.7		9.7	
1.5	12		12		12	
2	13.9		13.9		13.9	
3	17.1		17.1		17.1	
4	19.8		19.8		19.8	
5	22.2		22.2		22.2	
6	24.4		24.4		24.4	
8	28.4		28.4		28.4	
10	31.9		31.9		31.9	
11	33.6		33.6		33.6	
12	35.1		35.1		35.1	
12.4	35.8		35.8		35.8	
13.5	37.4		37.4		37.4	
15	39.6		39.6		39.6	
18	43.6		43.6		43.6	
24	50.9		50.9		-	
26.5	53.7		53.7		-	
40	67.2		-		-	

Average Power Handling

(1:1 VSWR, 25 C, Sea Level, Cable Only)

Freq (GHz)	TV-292 Watts (Max)	TV-292-LP Watts (Max)	TV-SMA Watts (Max)	TV-SMA-LP Watts (Max)	TV-TNCA	TV-TNCA-LP
0.5	726		726		726	
1	511		511		511	
1.5	415		415		415	
2	359		359		359	
3	291		291		291	
4	251		251		251	
5	224		224		224	
6	203		203		203	
8	175		175		175	
10	156		156		156	
11	148		148		148	
12	141		141		141	
12.4	139		139		139	
13.5	133		133		133	
15	126		126		126	
18	114		114		114	
24	98		98		-	
26.5	93		93		-	
40	74		-		-	

Low-Loss Cable Assembly Specifications

StabilityTVAC™ Cable Type	TV-N-LL	TV-N-LL-LP	TV-SMA-LL	TV-SMA-LL-LP	TV-TNC-LL	TV-TNC-LL-LP
Maximum Frequency	18 GHz				12.4 GHz	
VSWR (typical)	1.25					
VSWR (maximum)	1.30					
Typical Insertion Loss (cable only)	0.205 dB/ft				0.167 dB/ft	
Impedance (nominal)	50 ohm					
Phase Stability vs Flexure (typical)	±2°					
Amplitude Stability vs Flexure (typical)	±0.05 dB					
Phase Stability vs Temp	≤600PM (-55°C to 85°C)					
Velocity of Propagation	82% (nominal)					
Shielding Effectiveness	> 90 dB (DC - 18 GHz)				> 90 dB (DC – 12.4 GHz)	
Time Delay (nominal)	1.24 ns/ft (4.07 ns/m)					
Dielectric Withstanding Voltage	1500V		1000V			

Mechanical / Environmental Properties

StabilityTVAC™ Cable Type	TV-N-LL	TV-N-LL-LP	TV-SMA-LL	TV-SMA-LL-LP	TV-TNC-LL	TV-TNC-LL-LP
Center Conductor Material	Silver Plated Copper					
Maximum Outer Diameter (Connector)	0.820 in (20.83mm)		0.35 in (9mm)		0.622 in (15.8mm)	
Maximum Outer Diameter (Cable)	0.433 in (11.0mm)	0.307 in (7.8mm)	0.433 in (11.0mm)	0.307 in (7.8mm)	0.433 in (11.0mm)	0.307 in (7.8mm)
Nominal Weight (Cable)	1.37 oz/ft (128 g/m)					
Min. Static Bend Radius (Inch) / Min. Dynamic Bend Radius (Inch)	2.16 in / 4.33 in	1.535 in / 3.15 in	2.16 in / 4.33 in	1.535 in / 3.15 in	2.16 in / 4.33 in	1.535 in / 3.15 in
Flex Life Cycles	>500					
Crush Resistance	250 lbf/in (44 kgf/cm)	27 lbf/in (4.8 kgf/cm)	250 lbf/in (44 kgf/cm)	27 lbf/in (4.8 kgf/cm)	250 lbf/in (44 kgf/cm)	27 lbf/in (4.8 kgf/cm)
Operating Temperature Range	-67°F to 329°F (-55°C to 165°C)					
RoHS/REACH	Yes					
Outgassing	TML<1%, CVCM< 0.1%					

Max Insertion Loss/Attenuation

Freq (GHz)	TV-N-LL (db/100 ft)	TV-N-LL-LP (db/100 ft)	TV-SMA-LL (db/100 ft)	TV-SMA-LL-LP (db/100 ft)	TV-TNC-LL (db/100 ft)	TV-TNC-LL-LP (db/100 ft)
0.5	3.16		3.16		3.16	
1	4.5		4.5		4.5	
1.5	5.54		5.54		5.54	
2	6.42		6.42		6.42	
3	7.92		7.92		7.92	
4	9.2		9.2		9.2	
5	10.34		10.34		10.34	
6	11.38		11.38		11.38	
8	13.25		13.25		13.25	
10	14.91		14.91		14.91	
12	16.44		16.44		16.44	
12.4	16.73		16.73		16.73	
13.75	17.69		17.69		–	
14.5	18.2		18.2		–	
18	20.47		20.47		–	

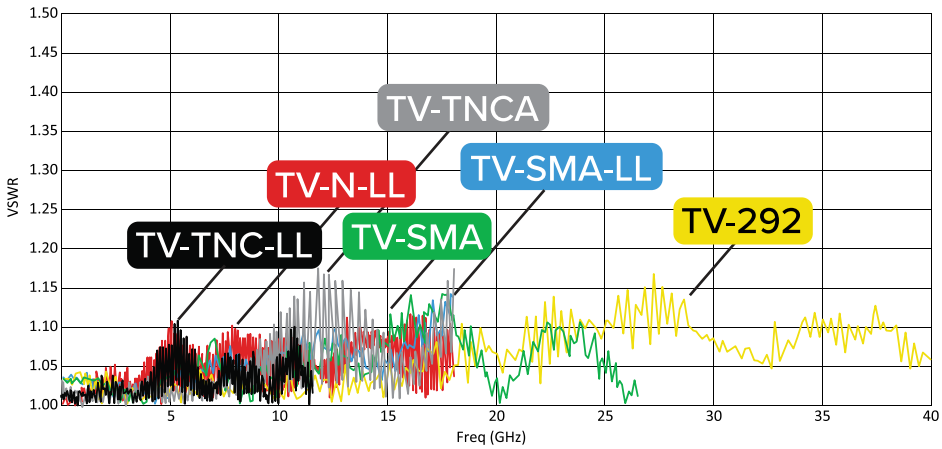
Average Power Handling

(1:1 VSWR, 25 C, Sea Level, Cable Only)

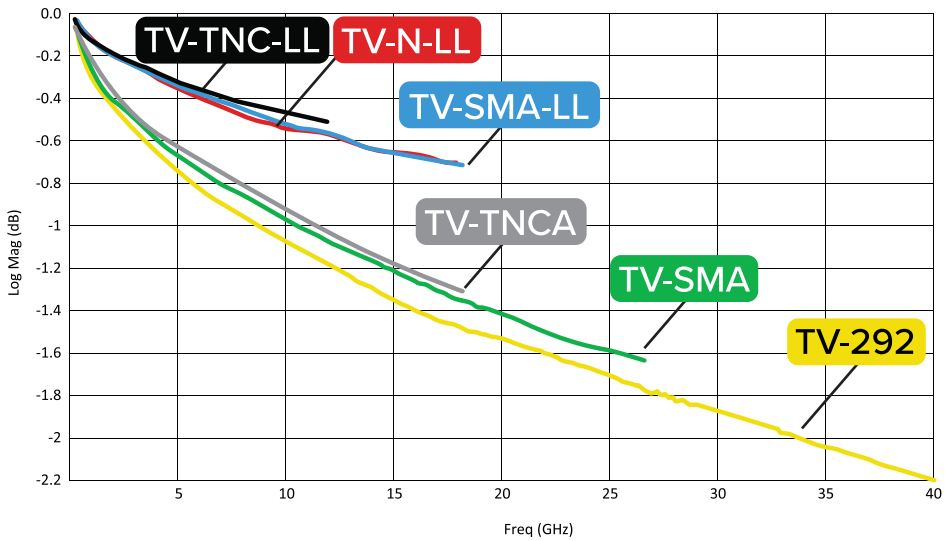
Freq (GHz)	TV-N-LL Watts (Max)	TV-N-LL-LP Watts (Max)	TV-SMA-LL Watts (Max)	TV-SMA-LL-LP Watts (Max)	TV-TNC-LL Watts (Max)	TV-TNC-LL-LP Watts (Max)
0.5	2579		2579		2579	
1	1812		1812		1812	
1.5	1472		1472		1472	
2	1269		1269		1269	
3	1029		1029		1029	
4	886		886		886	
5	789		789		789	
6	717		717		717	
8	615		615		615	
10	547		547		547	
12	496		496		496	
12.4	487		487		487	
13.75	461		461		–	
14.5	448		448		–	
18	398		398		–	

Maury StabilityTVAC™ Cable Assembly Typical Performance

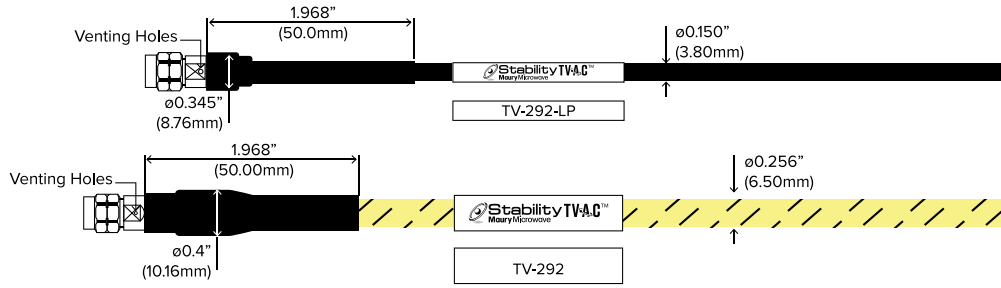
Maury StabilityTVAC™ 36" Cable Assembly Typical VSWR

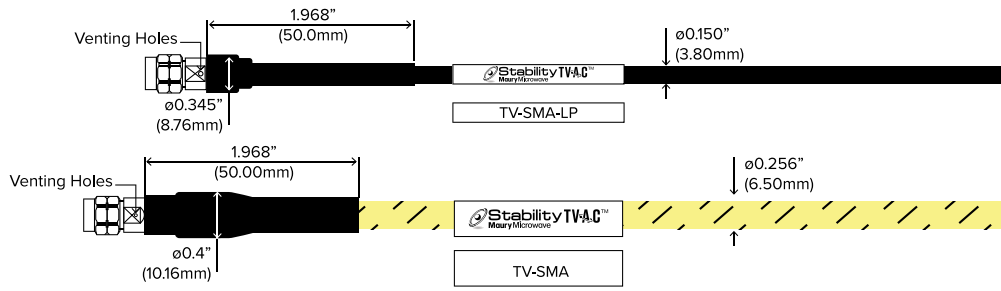


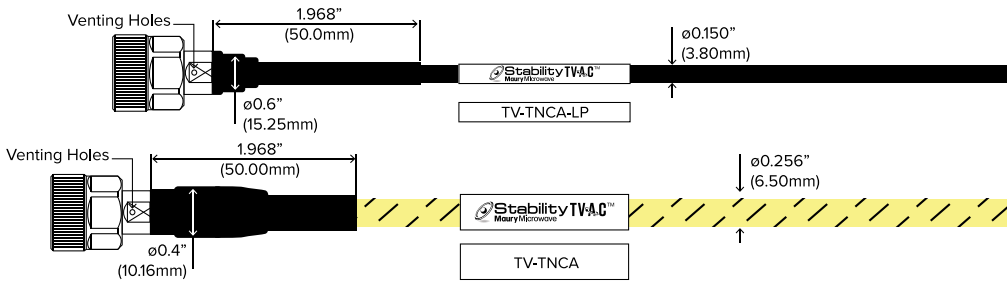
Maury StabilityTVAC™ 36" Cable Assembly Typical Insertion Loss

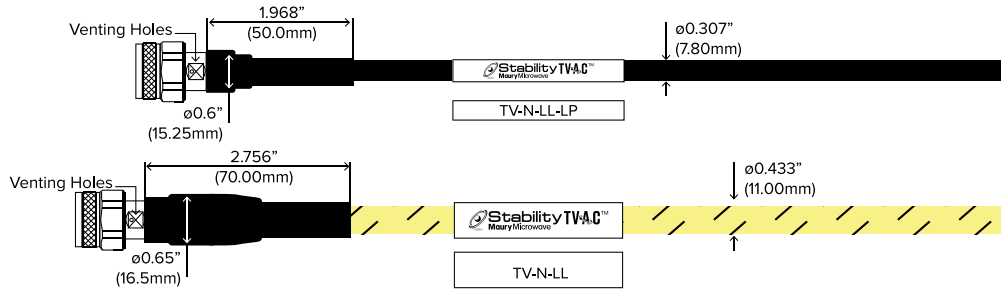


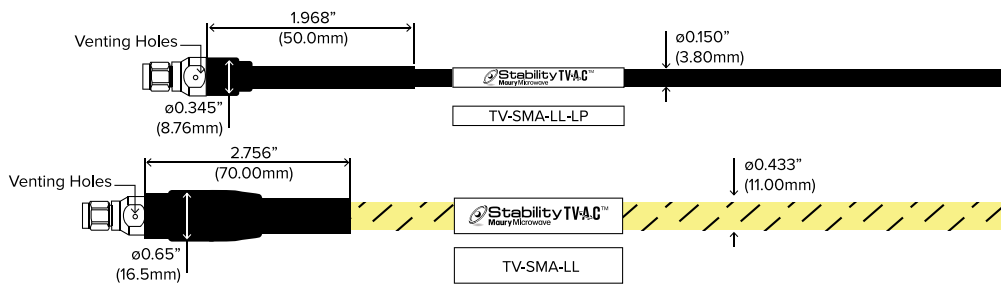
StabilityTVAC™ Dimensions

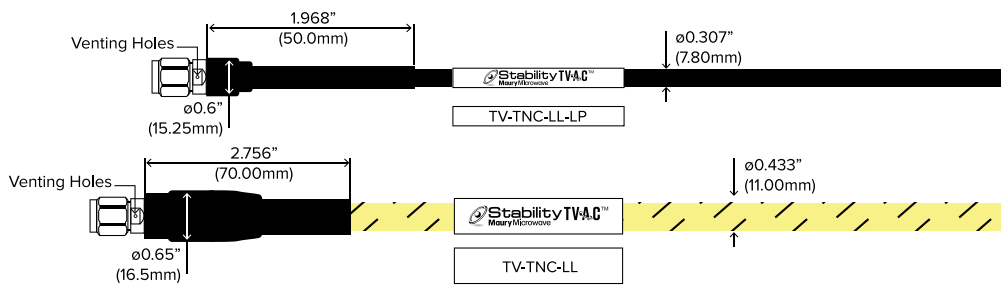










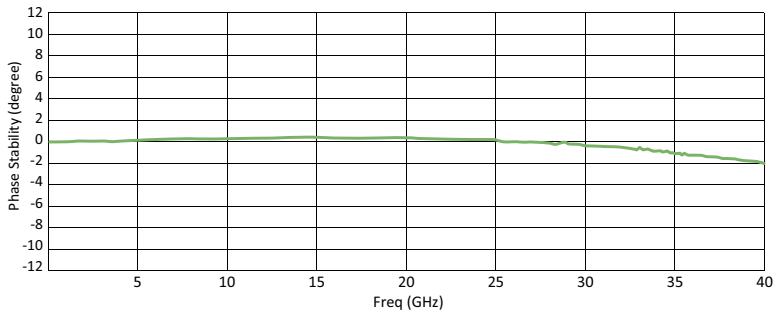


Phase Stability

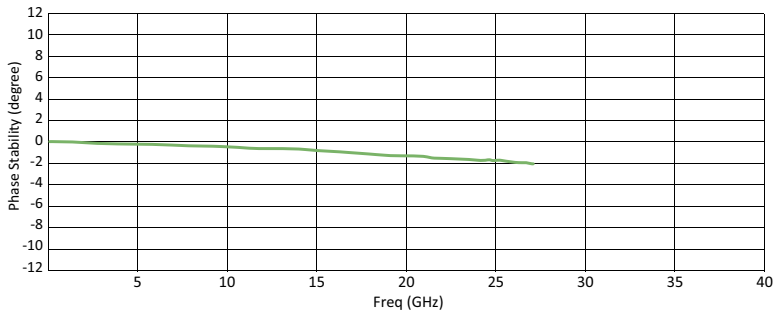
The maximum value for phase and amplitude stability was established using the following method. The cable was terminated with a short. With the cable in a straight position the VNA was normalized. The cable was coiled 360° around a mandrel 4 inches in diameter counter-clockwise and held in position for one sweep. The maximum deviation over the frequency range was recorded. The cable was then coiled 360° around the mandrel clockwise and held in position for one sweep and the maximum deviation was recorded. The cable was then returned to its original position for one sweep and the maximum deviation was recorded.

The plots on the right show the recorded worst-case phase variation.

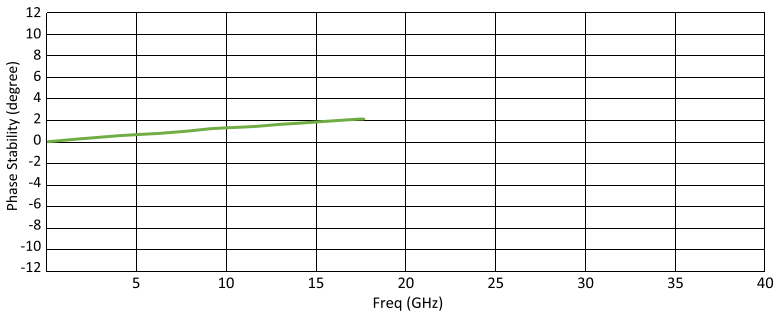
Exemplary data for TV-292



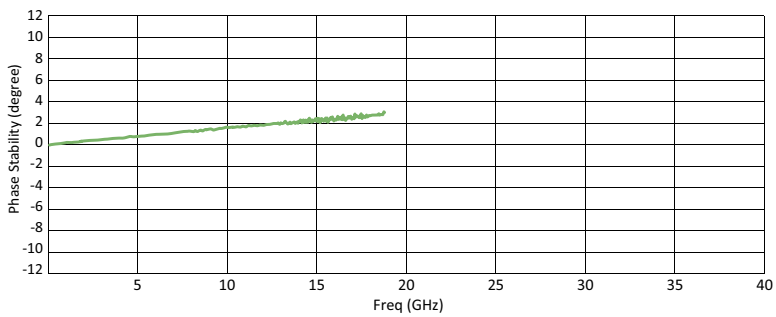
Exemplary data for TV-SMA



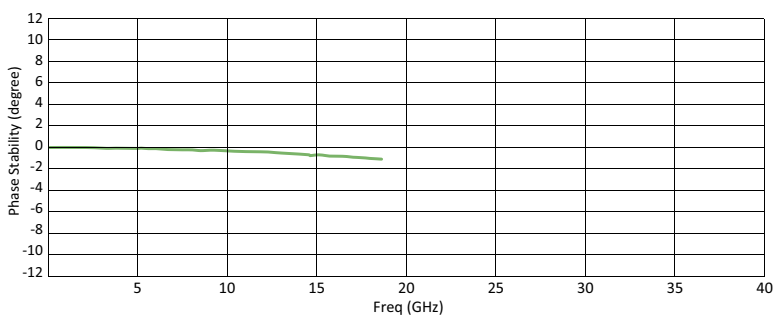
Exemplary data for TV-TNCA



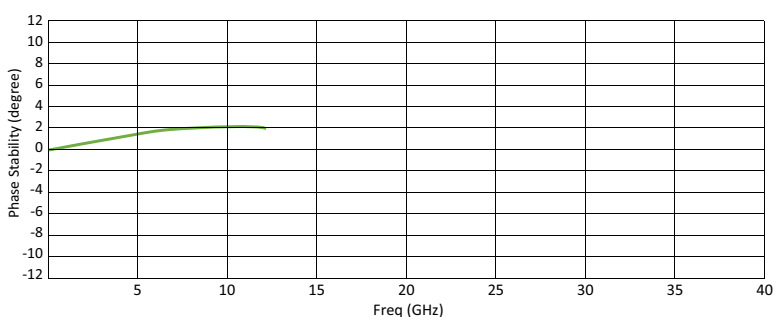
Exemplary data for TV-N-LL



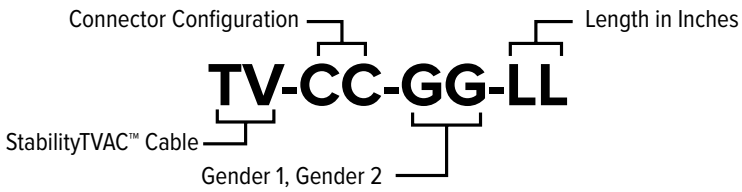
Exemplary data for TV-SMA-LL



Exemplary data for TV-TNC-LL



Ordering Instructions for StabilityTVAC™ Cable Assemblies

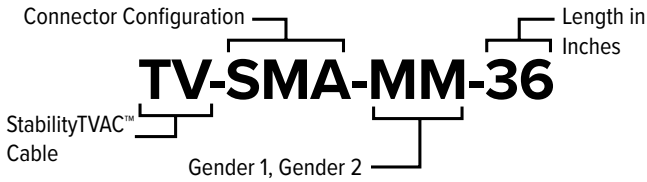


CC	GG	LL	Optional
292 (2.92mm) SMA	MM (Male to Male) MF (Male to Female) FF (Female to Female)	Custom length	LP (Low Profile)

EXAMPLE:

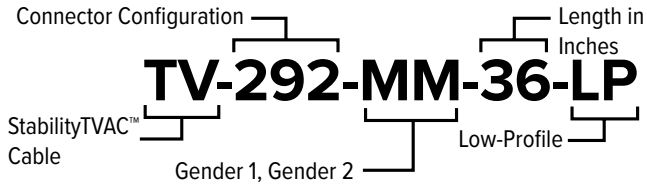
The following is a StabilityTVAC™ cable assembly with SMA male connectors on both ends, and 36 inches overall length.

Configuration Sample

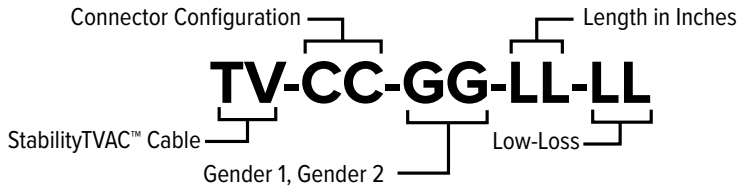


EXAMPLE:

The following is a low-profile StabilityTVAC™ cable assembly with 2.92mm male connectors on both ends, and 36 inches overall length.



Ordering Instructions for Low-Loss StabilityTVAC™ Cable Assemblies

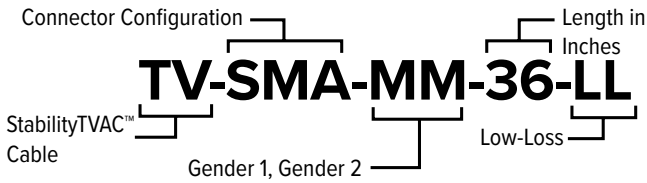


CC	GG	LL	LL	Optional
N (Type N) SMA TNC	MM (Male to Male) MF (Male to Female) FF (Female to Female)	Custom length	Low-loss	LP (Low Profile)

EXAMPLE:

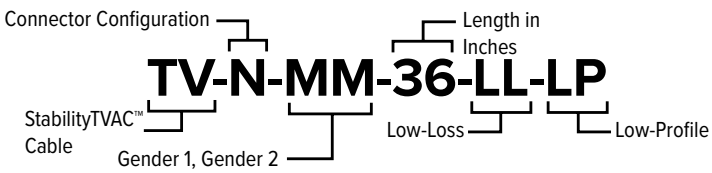
The following is a low-loss StabilityTVAC™ cable assembly with SMA male connectors on both ends, and 36 inches overall length.

Configuration Sample



EXAMPLE:

The following is a low-loss low-profile StabilityTVAC™ cable assembly with Type N male connectors on both ends, and 36 inches overall length.



StabilityWafer™ Microwave/RF Cable Assemblies

SERIES SW-35, SW-292, SW-24, SW-185

Features and Benefits

- Stable and repeatable electrical performance
- Flexible to facilitate easy installation
- Small profile for tight spacing requirements
- Straight, right-angle and extended 90° and 83° connectors for optimized connections to probes
- Color-coded connectors to avoid damage caused by connector

Typical Applications

- Wafer probing

Stability™ Specifications

StabilityWafer™ Cable Type	Frequency	Typical Phase Stability with Flexure	Typical Amplitude Stability with Flexure
SW-185	67 GHz	±5°	±0.15 dB
SW-24	50 GHz	±3°	±0.05 dB
SW-292	40 GHz	±2°	±0.05 dB
SW-35	26.5 GHz	±2°	±0.04 dB

Electrical Properties

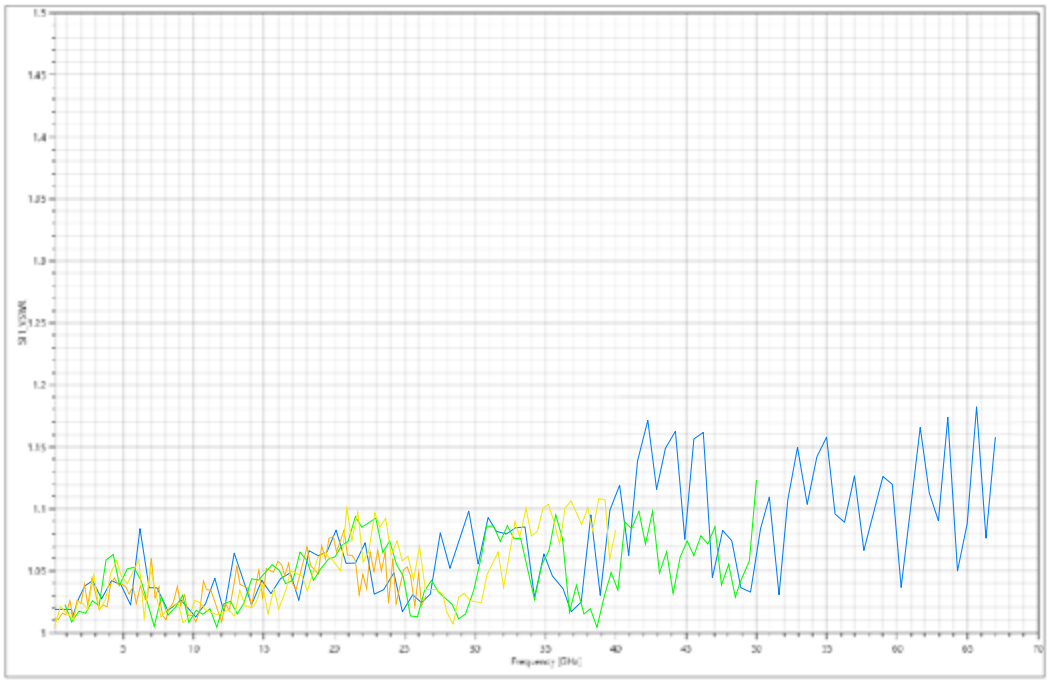
StabilityWafer™ Cable Type	SW-185	SW-24	SW-292	SW-35
Frequency (GHz)	67	50	40	26.5
VSWR (Max)	1.40:1	1.30:1	1.25:1	1.25:1
VSWR (Typical)	1.20:1	1.15:1	1.15:1	1.10:1
Typical IL (Cable Only db/Ft)	1.79	1.52	1.34	1.07
Phase Stability (Typical)	± 5°	± 3°	± 2°	± 2°
Phase Stability (Max)	±14°	± 10.5°	± 8.5°	± 5.5°
Amp Stability (Typical)	± 0.15 dB	± 0.05 dB	± 0.05 dB	± 0.04 dB
Amp Stability (Max)	± 0.20 dB	± 0.10 dB	± 0.10 dB	± 0.10 dB
Phase Stability vs Temp	<4°/m/GHz (–40°+105°C)			
Impedance (Nominal)	50 ohm			
Velocity of Propagation	74% (Nominal)			
Shielding Effectiveness	>90 dB (DC - 18 GHz)			
Time Delay (Nominal)	1.34 ns/ft			

Mechanical Properties

StabilityWafer™ Cable Type	SW-185-LL	SW-24	SP-292	SW-35
Center Conductor Material	Silver Plated Copper			
Maximum Outer Diameter Connector	0.36 in (9.2mm)			
Maximum Outer Diameter Cable	0.1 in (2.6mm)			
Nominal Weight	0.237 oz/ft			
Static Bend Radius	0.51 in (13mm)			
Dynamic Bend Radius	1.1 in (28mm)			
Flex Life Cycles	>10,000			
Connector Mating Cycles	>5,000			
Crush Resistance	>34 lbf/in			
Operating Temperature Range	–40°C to 105°C			
RoHS/REACH	Yes			

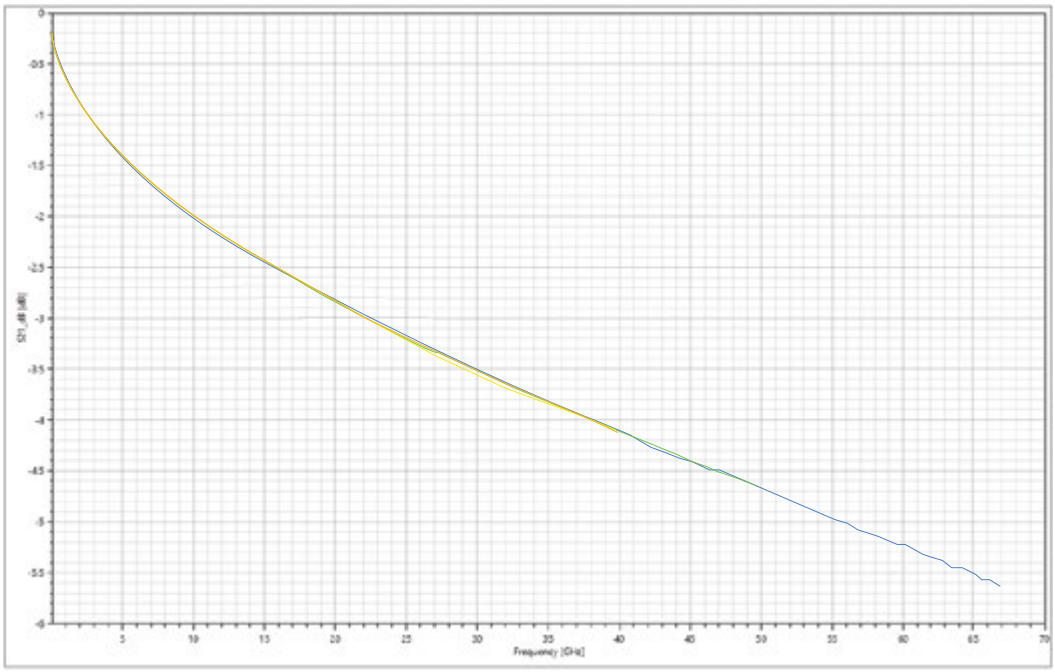
Maury StabilityWafer™ Cable Assembly Typical Performance

Maury StabilityWafer™ 36" Cable Assembly Typical VSWR



SW-185-LL SW-24-LL SW-292-LL SW-35-LL

Maury StabilityWafer™ 36" Cable Assembly Typical Insertion Loss



SW-185-LL SW-24-LL SW-292-LL SW-35-LL

Max Insertion Loss/Attenuation

(1:1 VSWR, 25 C, Sea Level, Cable Only)

Freq (GHz)	SW-185 (dB/100 ft)	SW-24 (dB/100 ft)	SW-292 (dB/100 ft)	SW-35 (dB/100 ft)
1	19.2	19.2	19.2	19.2
2	27.37	27.37	27.37	27.37
4	39.14	39.14	39.14	39.14
6	48.35	48.35	48.35	48.35
8	56.23	56.23	56.23	56.23
12	69.7	69.7	69.7	69.7
18	86.57	86.57	86.57	86.57
26.5	106.77	106.77	106.77	106.77
40	133.94	133.94	133.94	—
50	151.7	151.7	—	—
67	179	—	—	—

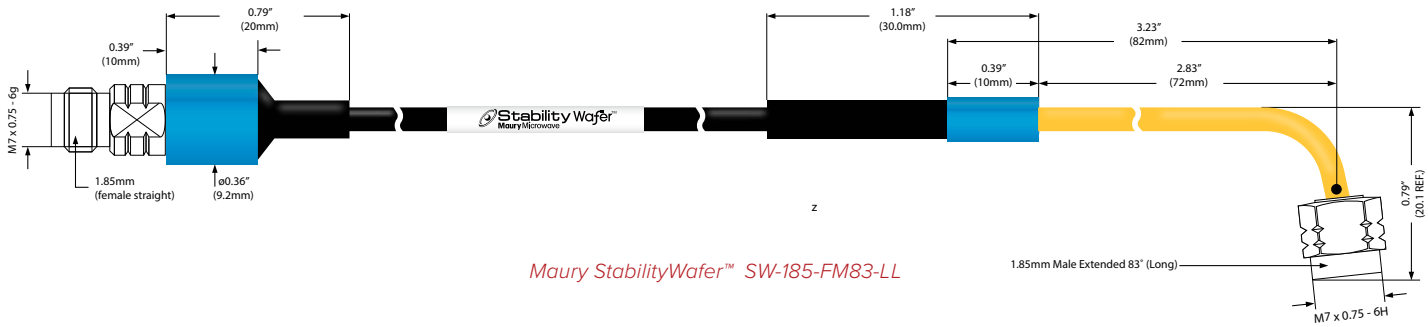
Average Power Handling

(1:1 VSWR, 25 C, Sea Level, Cable Only)

Freq (GHz)	SW-185 Watts (Max)	SW-24 Watts (Max)	SW-292 Watts (Max)	SW-35 Watts (Max)
1	271	271	271	271
2	190	190	190	190
4	133	133	133	133
6	108	108	108	108
8	93	93	93	93
12	75	75	75	75
18	60	60	60	60
26.5	49	49	49	49
40	39	39	39	—
50	34	34	—	—
67	29	—	—	—

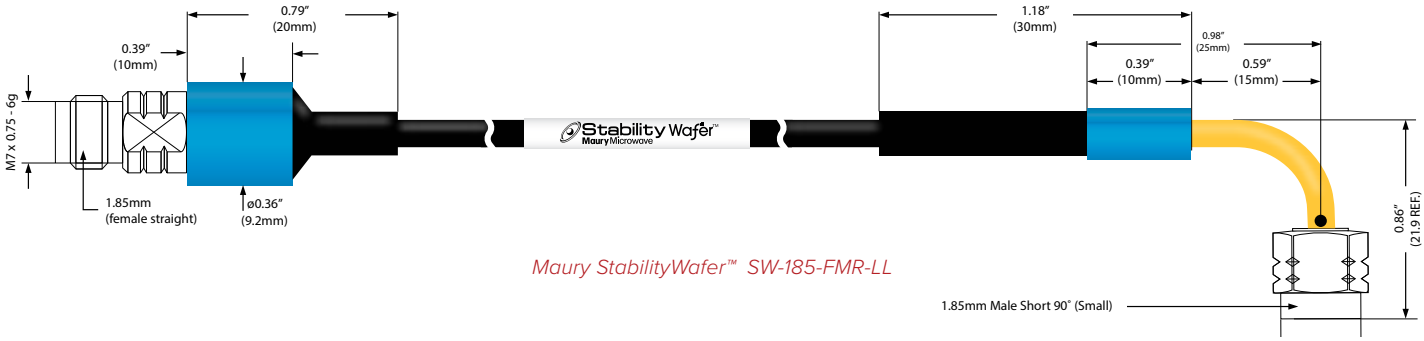
StabilityWafer™
Dimensions

Maury StabilityWafer™ SW-185-FM-LL



Maury StabilityWafer™ SW-185-FM83-LL

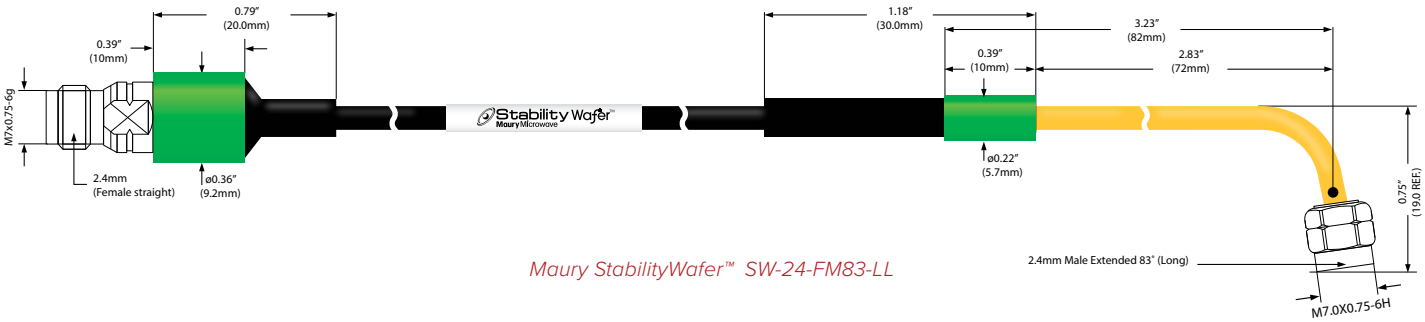
Maury StabilityWafer™ SW-185-FM90-LL



Maury StabilityWafer™ SW-185-FMR-LL

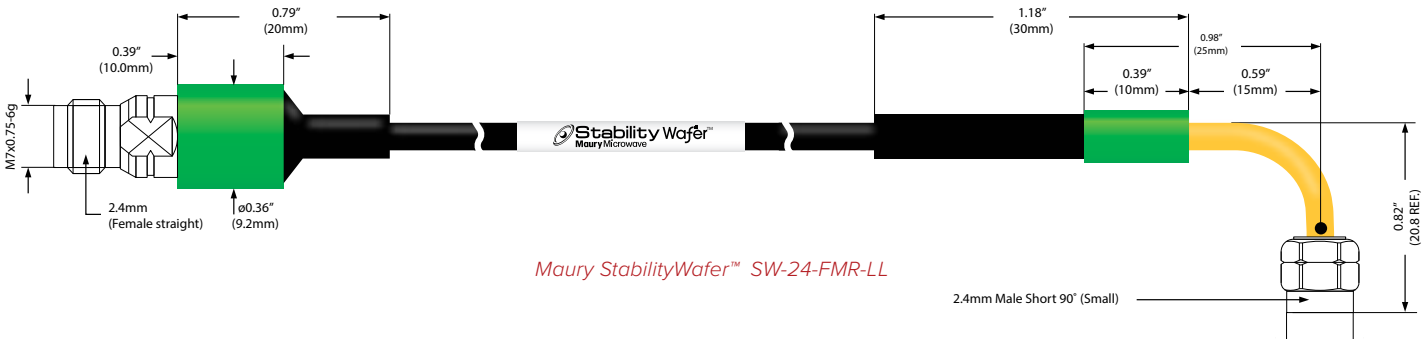
StabilityWafer™
Dimensions

Maury StabilityWafer™ SW-24-FM-LL



Maury StabilityWafer™ SW-24-FM83-LL

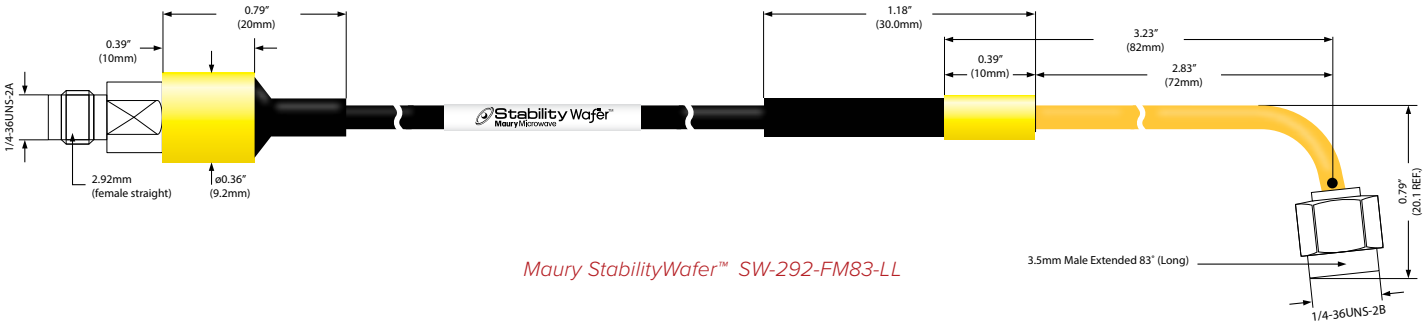
Maury StabilityWafer™ SW-24-FM90-LL



Maury StabilityWafer™ SW-24-FMR-LL

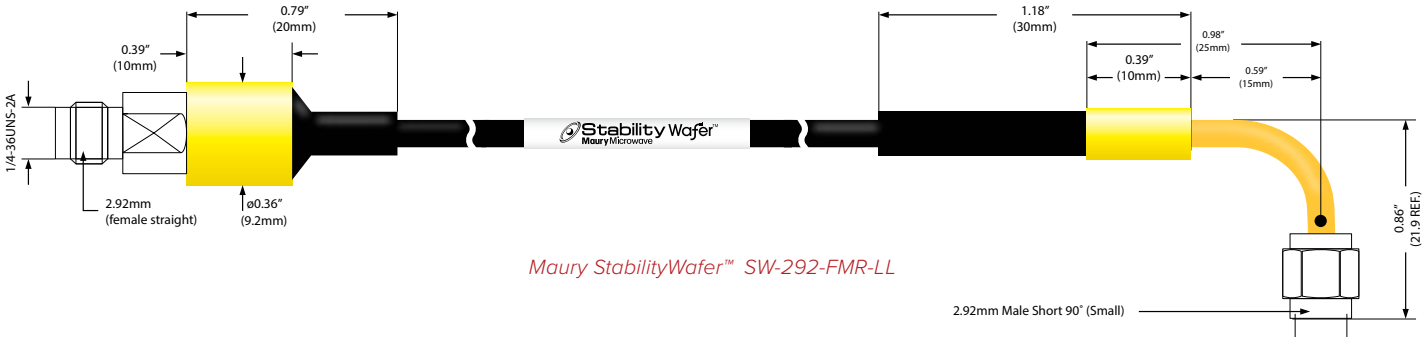
StabilityWafer™
Dimensions

Maury StabilityWafer™ SW-292-FM-LL



Maury StabilityWafer™ SW-292-FM83-LL

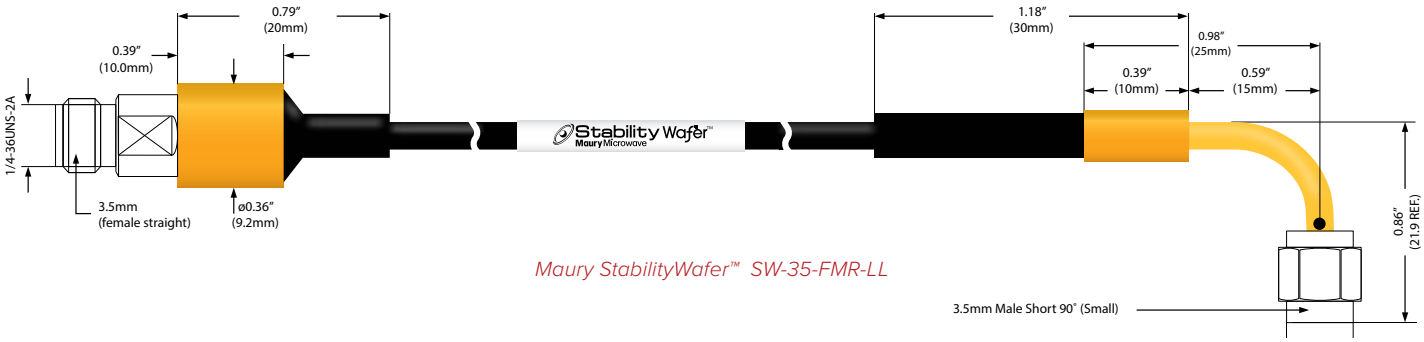
Maury StabilityWafer™ SW-292-FM90-LL



Maury StabilityWafer™ SW-292-FMR-LL

StabilityWafer™
Dimensions

Maury StabilityWafer™ SW-35-FM-LL



Maury StabilityWafer™ SW-35-FMR-LL

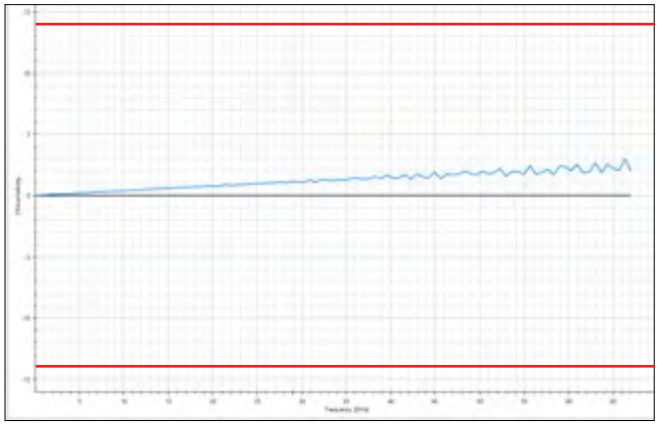
Phase Stability

The maximum value for phase and amplitude stability was established using the following method. The cable was terminated with a short. With the cable in a straight position the VNA was normalized. The cable was coiled 180° around a mandrel 4 inches in diameter counter-clockwise and held in position for one sweep. The maximum deviation over the frequency range was recorded. The cable was then coiled 180° around the mandrel clockwise and held in position for one sweep and the maximum deviation was recorded. The cable was then returned to its original position for one sweep and the maximum deviation was recorded.

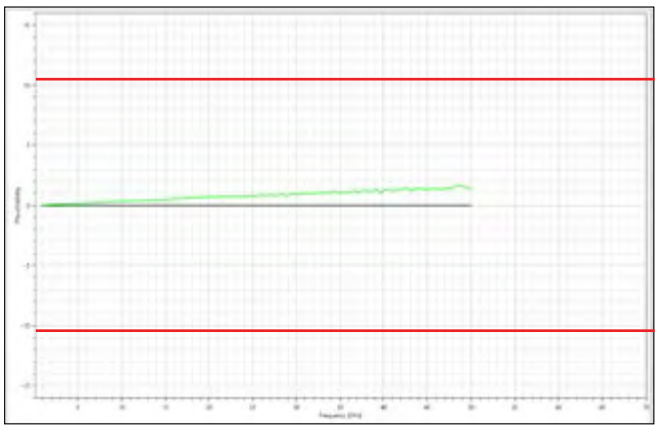
The plots on the right show the recorded worst-case phase variation.

Spec Typical Phase Variation

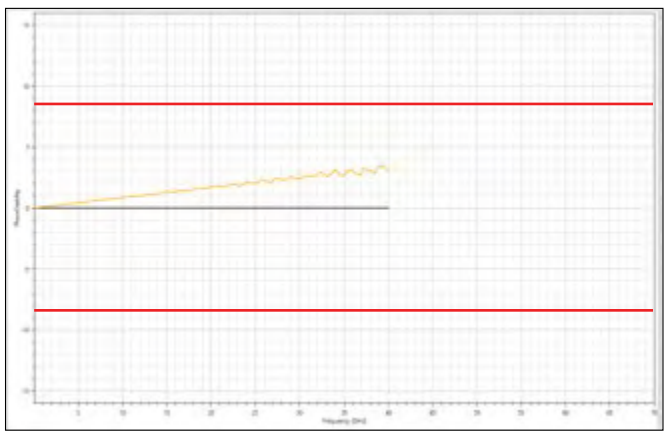
Exemplary data for SW-185-FM-36



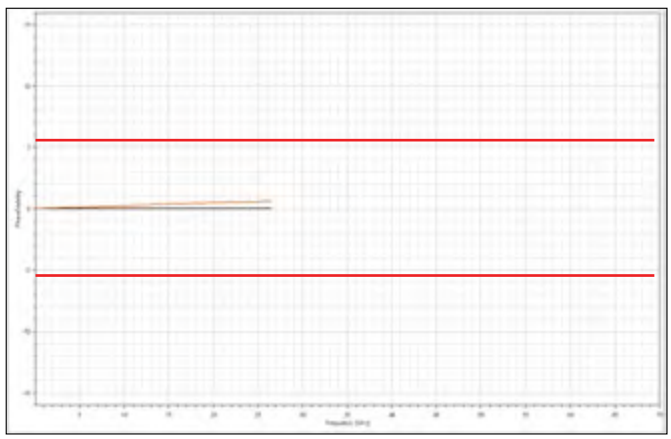
Exemplary data for SW-24-FM-36



Exemplary data for SW-292-FM-36

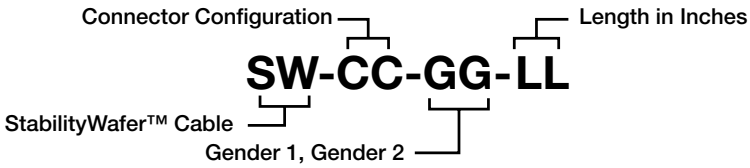


Exemplary data for SW-35-FM-36



Ordering Instructions for StabilityWafer™ Cable Assemblies

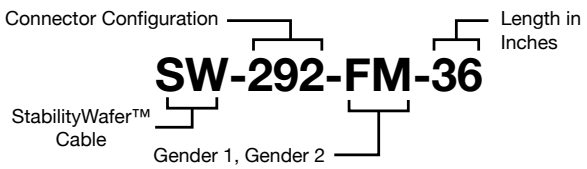
Standard StabilityWafer™ Cable Assemblies



CC	GG	LL (Standard Lengths)
35 (3.5mm) 292 (2.92mm) 24 (2.4mm) 185 (1.85mm)	FM (Female To Male) FMR (Female To Male Short 90˚) FM90 (Female To Male Extended 90˚) FM83 (Female To Male Extended 83˚) MM (Male To Male) MMR (Male To Male Short 90˚) MM90 (Male To Male Extended 90˚) MM83 (Male To Male Extended 83˚)	36 48 60

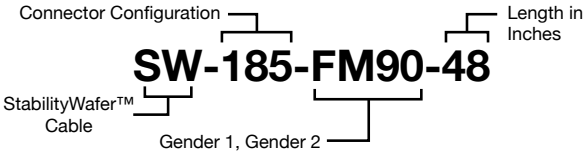
EXAMPLE:

The following is a StabilityWafer™ cable assembly with 2.92mm female connector on one end and 2.92mm male connector on the other end, and 36 inches overall length.



EXAMPLE:

The following is a StabilityWafer™ cable assembly with 1.85mm female connector on one end and male extended 90˚ connector on the other end, and 48 inches overall length.



ColorConnect™ Precision Attenuators

AT-SERIES

AT-185-01-06 AT-24-01-03 AT-292-01-03 AT-SMA-02-03

AT-Series Attenuators

Features

- Fixed Coaxial Attenuators
- Precision 1.85mm, 2.4mm, 2.92mm & SMA Male/Female Connectors
- Color Coded For Easy Identification

Description

Maury Microwave's AT-series of fixed coaxial attenuators are used to reduce the power of a RF, MW or mmW signal without distorting its signal quality/ waveform. Attenuators are often used to lower the amplitude of a signal to a measurable level or to protect a measurement instrument from damage. Attenuators are also used to improve matching between components by improving the return loss (twice insertion loss) and effectively reducing the VSWR seen by adjacent components. Key attenuator parameters include attenuation, frequency bandwidth, power handling, VSWR and quality/repeatability of connector.

ColorConnect™ Color Coding

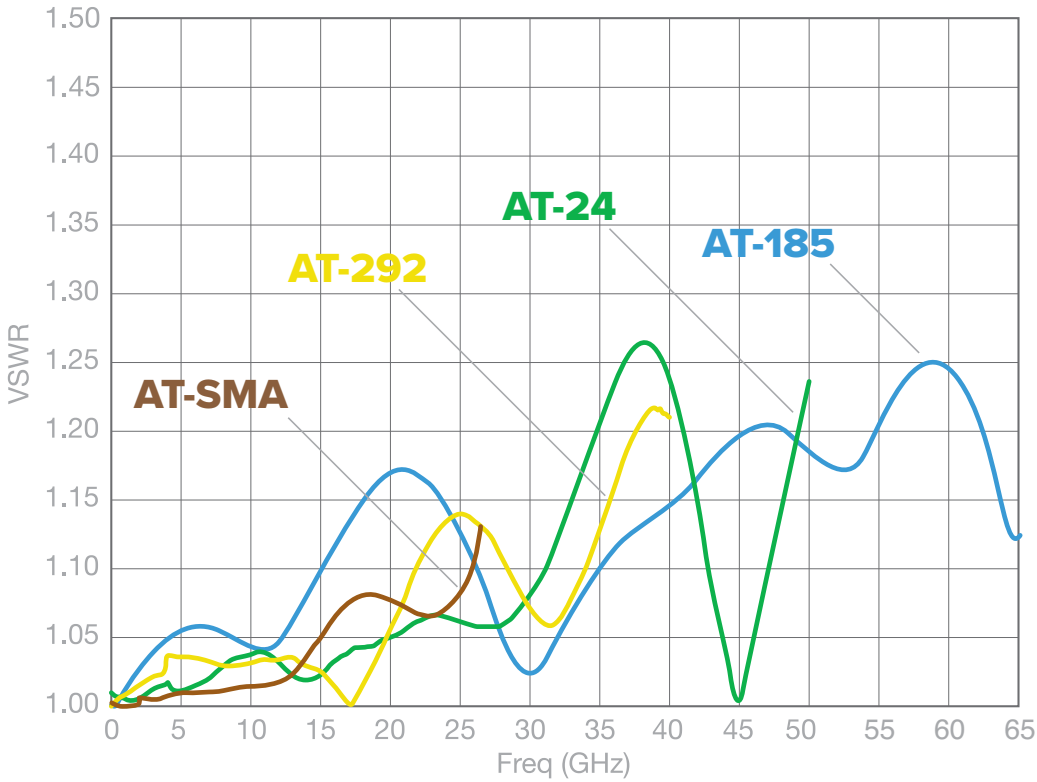
Maury AT-Series attenuators are part of the ColorConnect™ family. Following the proposed IEEE high-frequency connector/adapter color convention, AT-Series attenuators are the first commercially available attenuators to offer clear indications of compatibility and intermatability. ColorConnect™ makes 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 interconnects.

Available Models

Model	Connector 1	Connector 2	Frequency Range	Power Handling (W)	Attenuation (dB)	VSWR (typical)	VSWR (max)
AT-SMA-02-01	SMA male	SMA female	DC – 26.5	2	1	See graph	DC-18 GHz 1.35:1 18-26.5 GHz 1.50:1
AT-SMA-02-03					3		
AT-SMA-02-06					6		
AT-SMA-02-10					10		
AT-SMA-02-20					20		
AT-292-01-01	2.92mm male	2.92mm female	DC – 40	1	1		DC-18 GHz 1.30:1 18-40 GHz 1.40:1
AT-292-01-03					3		
AT-292-01-06					6		
AT-292-01-10					10		
AT-292-01-20					20		
AT-24-01-01	2.4mm male	2.4mm female	DC – 50		1		DC-26.5 GHz 1.35:1 26.5-40 GHz 1.60:1 40-50 GHz 1.75:1
AT-24-01-03					3		
AT-24-01-06					6		
AT-24-01-10					10		
AT-24-01-20					20		
AT-185-01-01	1.85mm male	1.85mm female	DC – 65		1		DC-26.5 GHz 1.35:1 26.5-40 GHz 1.55:1 40-65 GHz 1.65:1
AT-185-01-03					3		
AT-185-01-06					6		
AT-185-01-10					10		
AT-185-01-20					20		

ColorConnect™ Precision Attenuators Typical VSWR

AT-SMA, AT-292, AT-24 and AT-185



AT-SMA AT-292 AT-24 AT-185

Torque Wrenches

ALL MODELS

Description

Maury's torque wrenches are recommended for tightening coaxial connectors in order to obtain optimum repeatability and prolong connector life. They 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. The "TW" series has color coded bands corresponding to the Color Connect series identification.

Maury torque wrenches are included in many of our VNA calibration kits, and can be ordered separately by the model numbers listed in the chart below.

TW-8

TW-5

TW-12

2698K1

2698C2

8799A1

8799D1

Note: The models shown are delivered in a non-calibrated state unless calibration is requested at the time they are ordered. Maury highly recommends annual re-calibration of these torque wrenches to ensure their continued ability to properly tighten connections. Torque wrenches that are subject to heavy use should have their calibration checked more frequent.

Available Models

Model	For Use With Connector	Wrench Size (Inches)	Preset Torque (in.lbs.)	Handle Color[4]
2698C2	7mm, N[1], NMD3.5, NMD2.92, NMD2.4, NMD1.85	0.75 HEX	12 ±0.8	BLUE
2698G1	TNC[2]	0.562 HEX	12 ±0.8	BLUE
2698K1	7-16	1.062 HEX	20 ±1.2	GREEN
8799A1[3]	3.5mm, 2.92mm, 2.4mm, 1.85mm	0.312 HEX	8 ±0.5	RED
8799D1	SMA	0.312 HEX	5 ±0.3	BLACK
TW-5	SMA	0.312 HEX	5 ±0.5	BROWN[5]
TW-8	3.5mm, 2.92mm, 2.4mm, 1.85mm,	0.312 HEX	8 ±0.8	BLUE, GREEN, YELLOW, ORANGE[5]
TW-12	7mm, N[1], NMD3.5, NMD2.92, NMD2.4, NMD1.85	0.75 HEX	12 ±1.2	RED[5]

[1] Precision N connectors supplied with 3/4 hex nuts.
[2] Precision TNC connectors supplied with 9/16 hex nuts.
[3] WARNING: Do Not Use on SMA connectors. Damage can result.
[4] Unless otherwise marked on nameplate, handle color represents torque value: blue = 12 in. lbs., red = 8 in. lbs., black = 5 in. lbs., gold = 20 in. lbs.
[5] Has color coded bands corresponding to the Color Connect series identification.

Connector Gages and Connector Gage Kits

GENERAL INFORMATION

Features

- > Direct Reading, Self-Checking
- > Accurate, Easy to Use
- > Digital and/or Dial Indicator Styles

A048A 1.85mm/2.4mm Digital Connector Gage Kit

A048A (Female) and A048B (Male) Digital Gages with Master Blocks (Enlarged)

Description

Maury connector gage kits provide an easy and accurate way to measure critical linear interface dimensions of most coaxial connectors. Each kit consist of gages with specially adapted indicators, and the bushings and pins needed to mate with specified connectors. Master setting gages are used to adjust the dial indicators (or digital indicators) to zero, before push-on or thread-on gages are mated with connectors to measure the distance from a given interface (male shoulder, etc.) to the outer conductor mating plane. The table below lists available models. Additional information is found in the referenced data sheets.

Why You Need Connector Gages

The Importance of checking the critical mechanical dimensions of your coaxial connectors before mating cannot be overstated. Superior electrical performance depends on making sure all the coaxial connectors in you test setup are operating within their specified tolerances. Pin depth and position of the center conductors are especially critical in that regard.

If the male and female contacts are recessed beyond tolerance they will exhibit a "gap-fit" connection when mated. This causes significant reduction of electrical performance.

If the male and female contacts protrude beyond their specified tolerances they will exhibit an "interference-fit" when mated. This will also degrade electrical performance, with adverse effects on measurement accuracy, and may result in catastrophic damage to the center connectors and contacts.

Since 1962 Maury Microwave has been designing connector gage kits that provide the best method of checking pin depth and position in all the most popular coaxial connector types. Today these include digital gage kits in 1.85mm/2.4mm and 2.92mm/3.5mm, 7mm, and Type N connector types, and dial-indicator gage kits in 1.85mm/2.4mm, 2.92mm/3.5mm, 7mm, type N (in 50 ohm and 75 ohm models), BNC, TNC, SMA and SMP/GPO™[1] connector types.

All Maury connector gage kits are designed for superior durability, stability and repeatability. Each kit includes at least one connector gage with the master gage block or blocks necessary to ensure the accuracy of the gages. Kits are available as metrology grade thread-on designs or hand-held push-on designs.

Available Models - Digital Indicator Style

Connector Type	Dial Resolution (Inches)	Model [2]	Description
1.85mm/2.4mm	0.001mm/0.00004 in.	A048A	Two thread-on metrology grade digital gages measure female and male contact pin locations.
2.92mm (K)/3.5mm	0.001mm/0.00004 in.	A050A	Two thread-on metrology grade digital gages measure female and male contact pin locations.
Type N	0.001mm/0.00004 in.	A020K	Two thread-on metrology grade digital gages measure type N female and male connectors, sliding loads, airlines, two-port standards, VNA test port adapters, etc.
7mm	0.001mm/0.00004 in.	A028F	One thread-on metrology grade digital gage measure 7mm connectors.

[1] *GPO™ is a trademark of the Gilbert Engineering Co., Inc.*

[2] *Please reference to data sheet 2Y-051 for individual model details.*

Available Models - Dial Indicator Style

Connector Type	Dial Resolution (Inches)	Model [2]	Description
2.92mm (K)/ 3.5mm	0.00025	A034B1	Two push-on gages measure female and male contact pin interface locations.
2.92mm (K)/ 3.5mm	0.0001	A034E	Two metrology grade thread-on gages measure female and male contact pin interface locations.
1.85/2.4mm	0.0001	A035E	Two metrology grade thread-on gages measure female and male contact pin interface locations.
7mm	0.0001	A028D	One thread-on metrology grade gage measures planar contact location.
Type N	0.001	A007A	One push-on gage measures female and male contact pin location.
Type N	0.00025	A020A	One push-on gage measures female and male contact pin location.
Type N	0.0001	A020D	Two metrology grade thread-on gages measure female and male contact pin interface locations.
Type N (75 ohms)	0.00025	A020G	One push-on gage measures female and male contact pin location of 75 ohm type N connectors.
BNC/TNC	0.0005	A012A	One push-on gage measures female and male contact pin and dielectric interface locations.
SMA	0.0005	A027P1	Two push-on gages measure female and male contact pin interface locations.
SMA	0.0005	A027A1	Four push-on gages measure female and male contact pin and dielectric interface locations.
SMA	0.0005	A027G1	Two push-on gages measure female contact pin and dielectric interface locations.
SMA	0.0005	A027M1	Three push-on gages measure standard male contact pin and dielectric interface locations, and the stepless 0.085-inch male pin dimension.
SMP/GPO™ [1]	0.0005	A042A	Three push-on gages measures SMP connectors' contact pin and dielectric interface locations.

[1] GPO™ is a trademark of the Gilbert Engineering Co., Inc.

[2] Please reference to data sheet 2Y-051 for individual model details.