StabilityPlus™ Microwave/RF Cable Assemblies

DATA SHEET / 2Z-009

THE INDUSTRY'S BEST PHASE STABLE CABLE ASSEMBLY JUST GOT BETTER!

StabilityPlus™ Maury Microwave

MODELS:

SP-185 // 1.85mm color-coded StabilityPlus™ cables
SP-24 // 2.4mm color-coded StabilityPlus™ cables
SP-292 // 2.92mm color-coded StabilityPlus™ cables
SP-35 // 3.5mm color-coded StabilityPlus™ cables
SP-N // Type N color-coded StabilityPlus™ cables

Maury Microwave

// AUGUST 2020

StabilityPlus™ Microwave/RF Cable Assemblies

SERIES SP-185 , SP-24, SP-292, SP-35 AND SP-N

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	±8°	±0.15 dB
SP-24	50 GHz	±6°	±0.05 dB
SP-292	40 GHz	±4.5°	±0.05 dB
SP-35	26.5 GHz	±3°	±0.05 dB
SP-N	18 GHz	±2°	±0.05 dB

Standard Cable Assembly Specifications

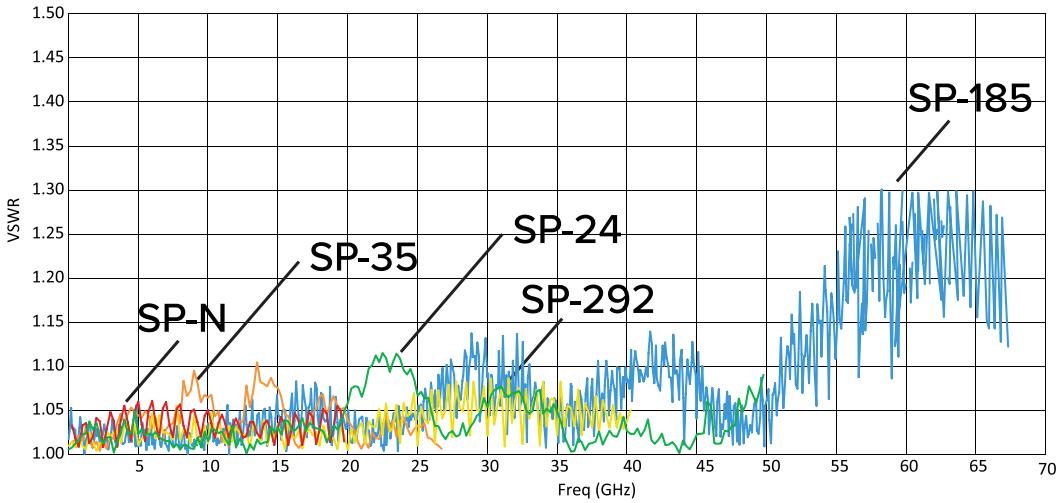
StabilityPlus™ Cable Type	SP-185	SP-24	SP-292	SP-35	SP-N
Maximum Frequency	67 GHz	50 GHz	40 GHz	26.5 GHz	18 GHz
VSWR (typical)	1.40:1	1.30:1	1.25:1		
Typical Insertion Loss (cable only)	1.79 dB/ft	1.00 dB/ft	0.89 dB/ft	0.72 dB/ft	0.61 dB/ft
Impedance (nominal)	50 ohm				
Phase Stability vs Flexure (typical)	±8°	± 6°	± 4.5°	± 3°	± 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)				
Velocity of Propagation	74% (nominal)	76% (nominal)			
Shielding Effectiveness	>100 dB (DC - 18 GHz)				
Time Delay (nominal)	1.34 ns/ft (4.5 ns/m)				

Mechanical / Environmental Properties

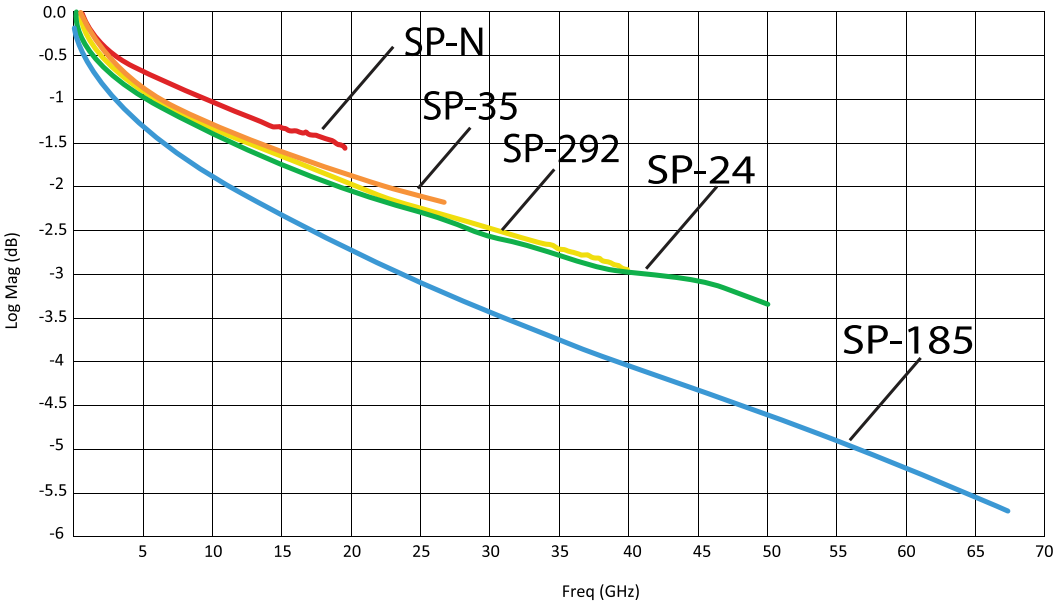
StabilityPlus™ Cable Type	SP-185	SP-24, SP-292, SP-35 & SP-N
Center Conductor Material	Silver Plated Copper	
Maximum Outer Diameter (Connector)	0.42 in (10.7mm)	0.49 in (12.5mm)
Maximum Outer Diameter (Cable)	0.2 in. (5mm)	0.25 in (6.35mm)
Nominal Weight	0.677 oz/ft (63g/m)	0.97 oz/ft (90g/m)
Min. Static 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

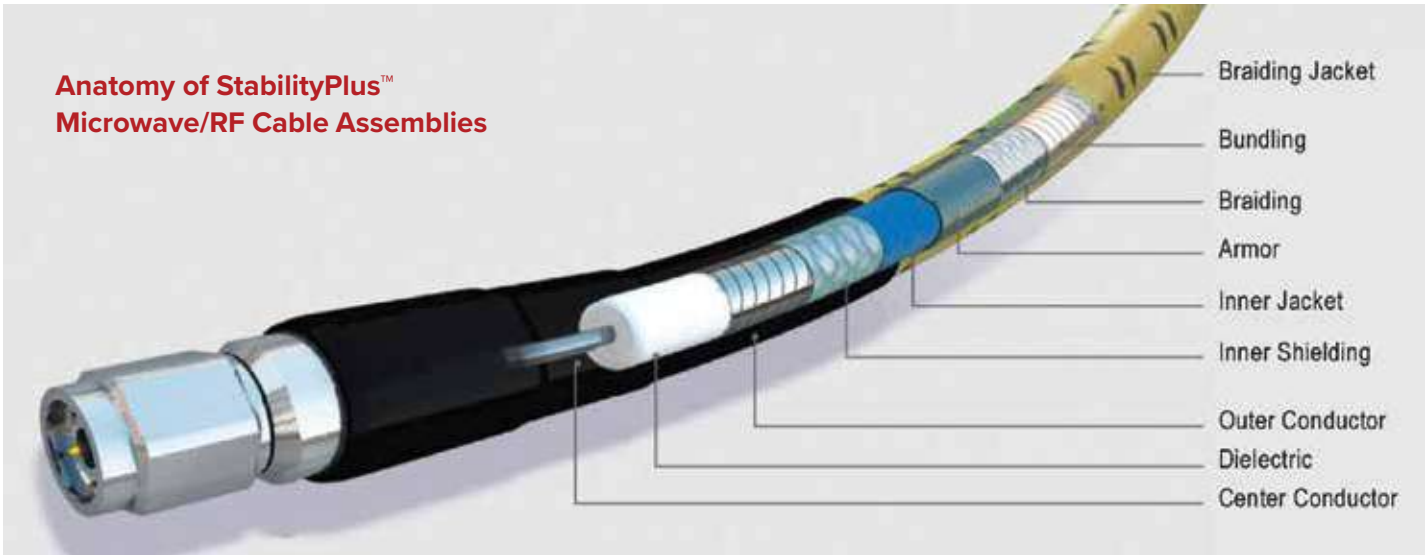
Maury StabilityPlus™ 36" Cable Assembly Typical VSWR



Maury StabilityPlus™ 36" Cable Assembly Typical Insertion Loss



Anatomy of StabilityPlus™ Microwave/RF Cable Assemblies



Max Insertion Loss/Attenuation

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

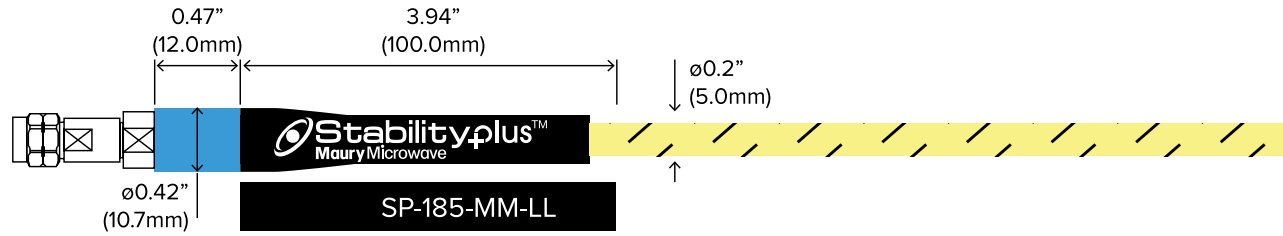
Freq (GHz)	SP-185 (dB/100 ft)	SP-24 (dB/100 ft)	SP-292 (dB/100 ft)	SP-35 (dB/100 ft)	SP-N (dB/100 ft)
1	19.00	13.3	13.3	13.3	13.3
2	27.00	19.00	19.00	19.00	19.00
4	39.00	27.20	27.00	27.52	27.52
6	48.00	33.20	33.20	33.20	33.20
8	56.00	38.40	38.40	38.40	38.40
12	70.00	47.40	47.40	47.40	47.40
18	87.00	58.50	58.50	58.50	58.50
26.5	108.00	71.60	71.60	71.60	—
40	136.00	88.90	88.90	—	—
50	155.00	100.10	—	—	—
67	183.00	—	—	—	—

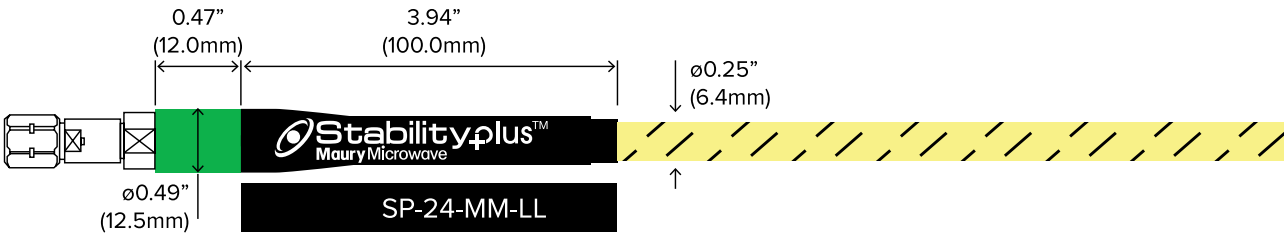
Average Power Handling

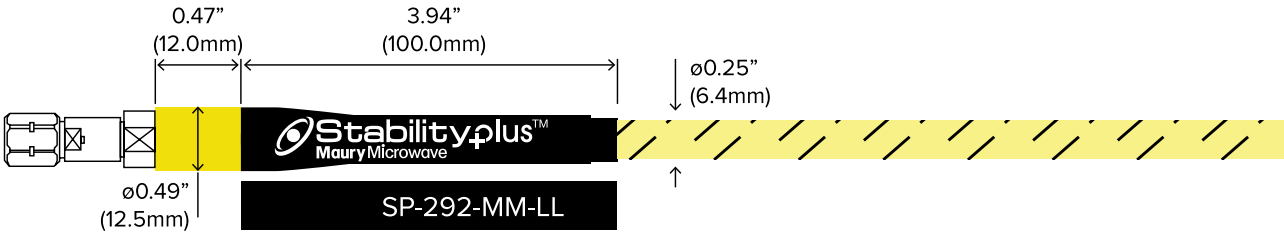
(1:1 VSWR, 25 C, Sea Level, Cable Only)

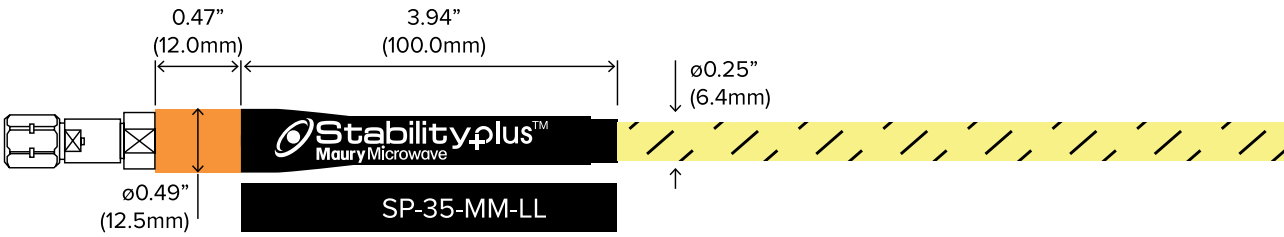
Freq (GHz)	SP-185 Watts (Max)	SP-24 Watts (Max)	SP-292 Watts (Max)	SP-35 Watts (Max)	SP-N Watts (Max)
1	271	409	409	409	409
2	190	288	288	288	288
4	132	202	202	202	202
6	107	165	165	165	165
8	92	142	142	142	142
12	74	115	115	115	115
18	59	93	93	93	93
26.5	48	76	76	76	—
40	38	61	61	—	—
50	34	55	—	—	—
67	28	—	—	—	—

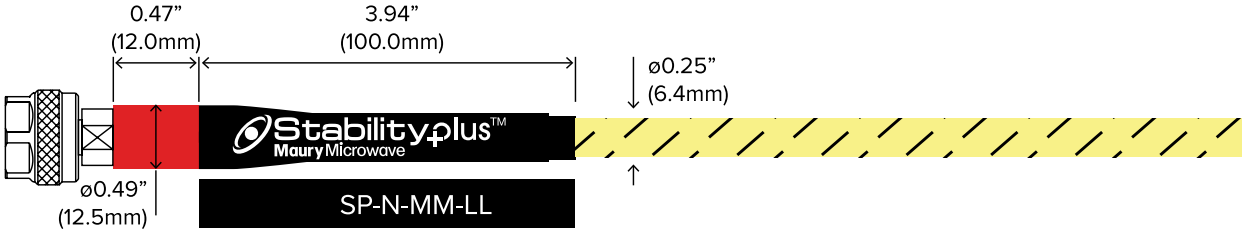
StabilityPlus™ Dimensions









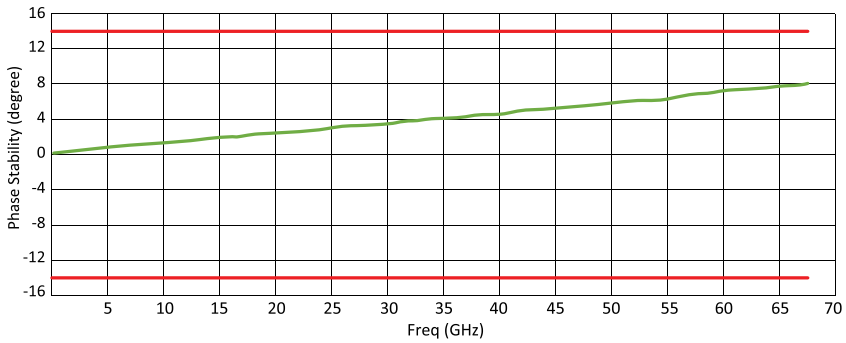


Phase Stability

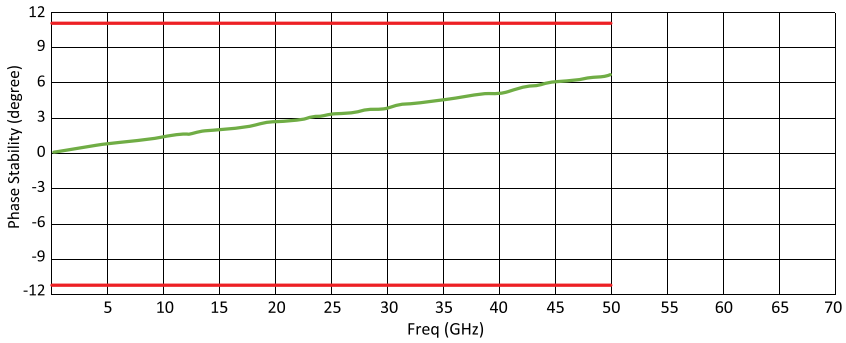
The maximum value for phase and amplitude stability was established using the following method. The cable was terminated with a short. With the cable in a straight position the VNA was normalized. The cable was coiled 360° around a mandrel 4 inches in diameter counter-clockwise and held in position for 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.

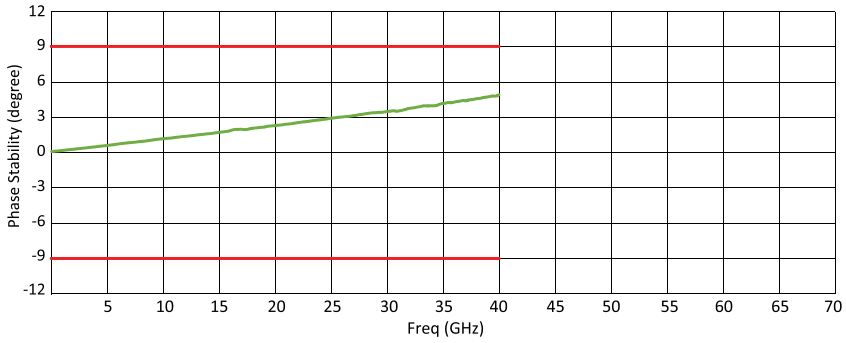
Exemplary data for SP-185-MM-36



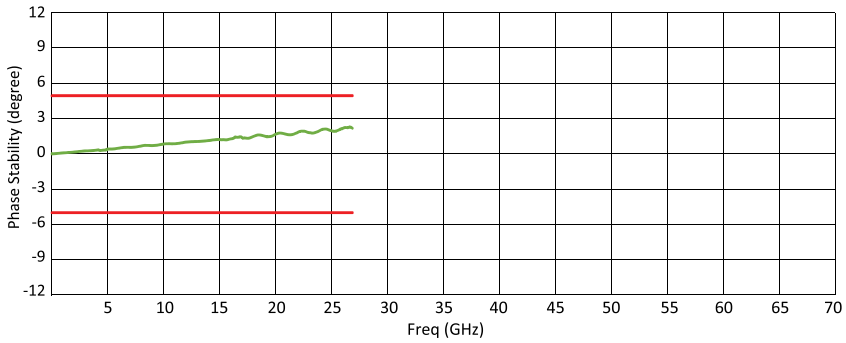
Exemplary data for SP-24-MM-36



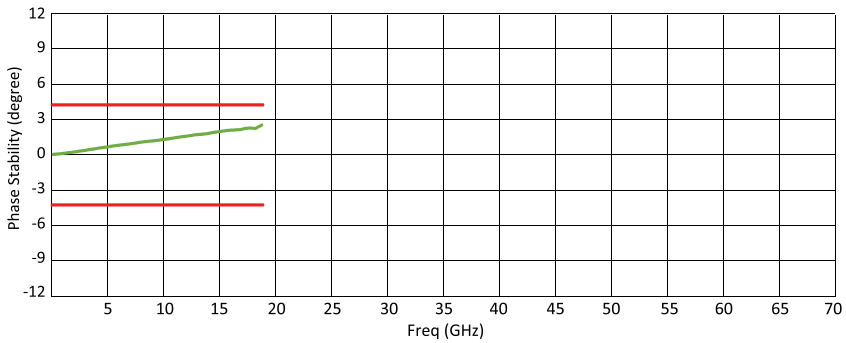
Exemplary data for SP-292-MM-36



Exemplary data for SP-35-MM-36

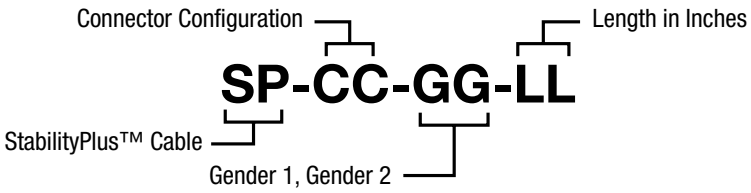


Exemplary data for SP-N-MM-36



Ordering Instructions for StabilityPlus™ Cable Assemblies

Standard StabilityPlus™ Cable Assemblies



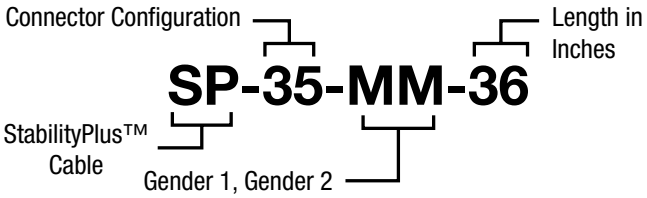
CC	GG	LL (Standard Lengths)
N (Type N)*		24
35 (3.5mm)	MM (Male To Male)	36
292 (2.92mm)	MF (Male to Female)	48
24 (2.4mm)	FF (Female To Female)	60
185 (1.85mm)		78

** Type N available in male only.*

EXAMPLE:

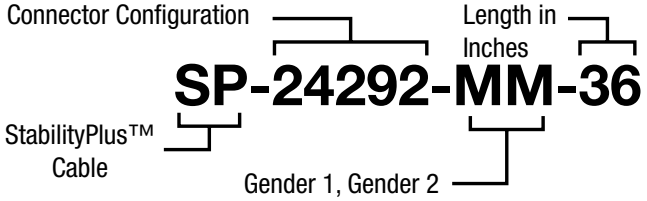
The following is a StabilityPlus™ cable assembly with 3.5mm male connectors on both ends, and 36 inches overall length.

Configuration Sample



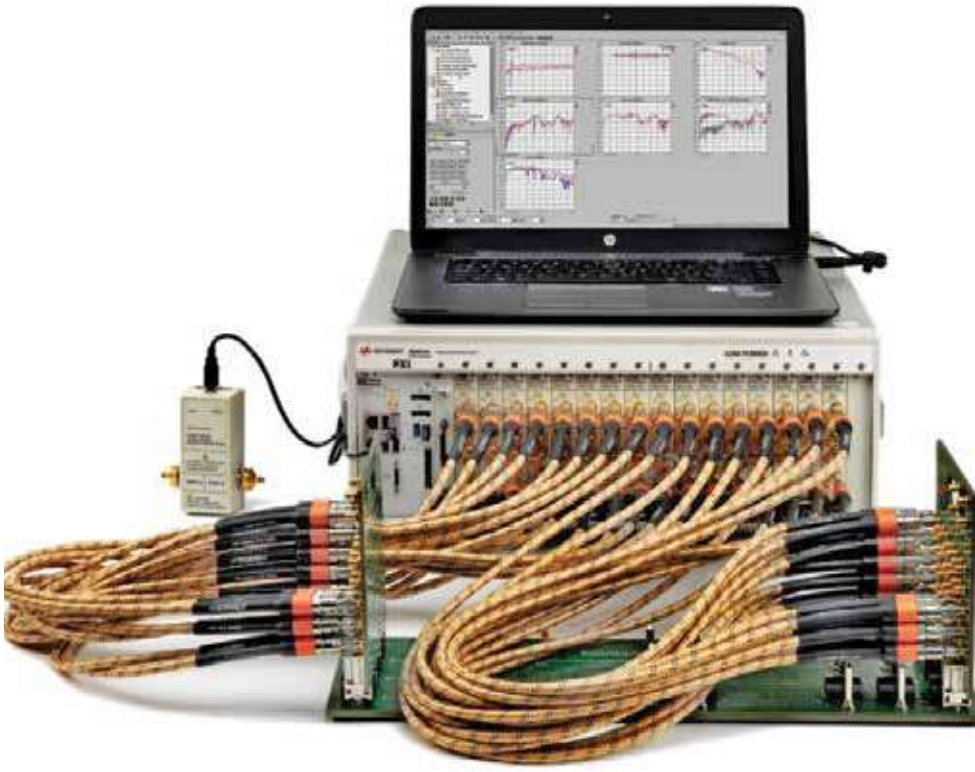
EXAMPLE:

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.



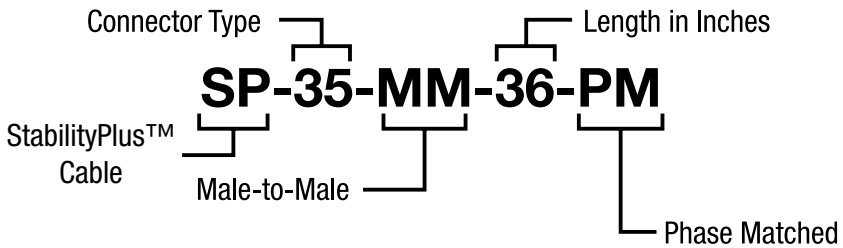
StabilityPlus™ Phase-Matched (PM) Cable Assembly Sets

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.



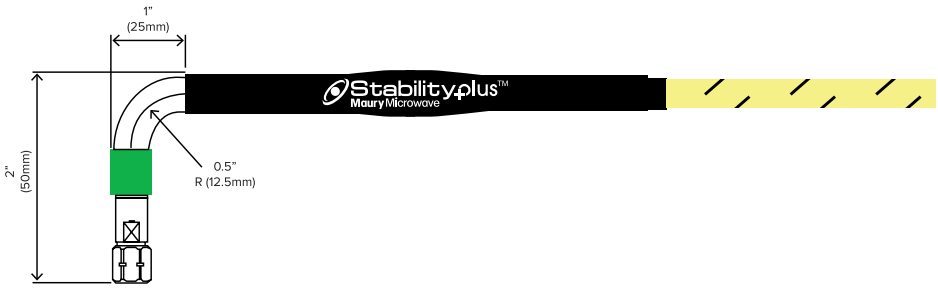
Ordering Instructions for StabilityPlus™ Phase-Matched (PM) Cable Assembly Sets

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

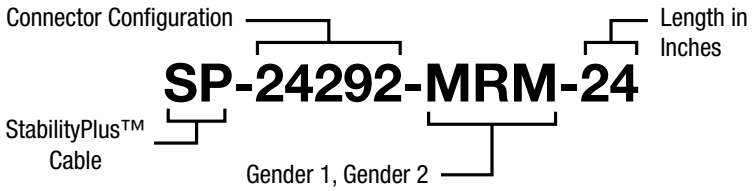
StabilityPlus™ Cable Assemblies with swept right-angle connectors are designed for applications requiring a fixed and stable bend where traditional cable assemblies may be inconvenient. With a bend radius of 0.5 inches and a cable-to-connector length of 2 inches, right-angle connectors allow StabilityPlus™ 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
N (Type N) 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)	Custom length

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.



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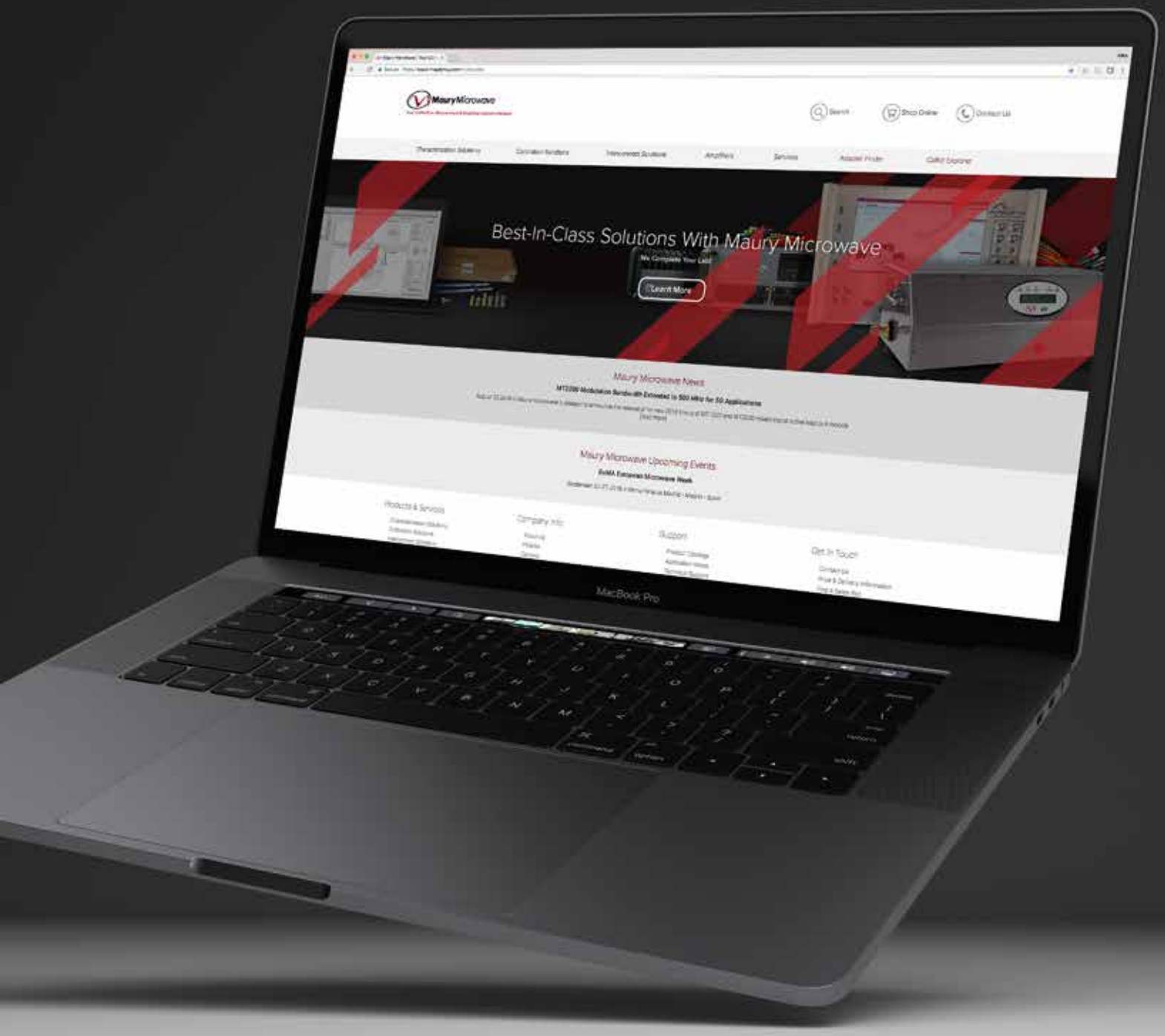

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