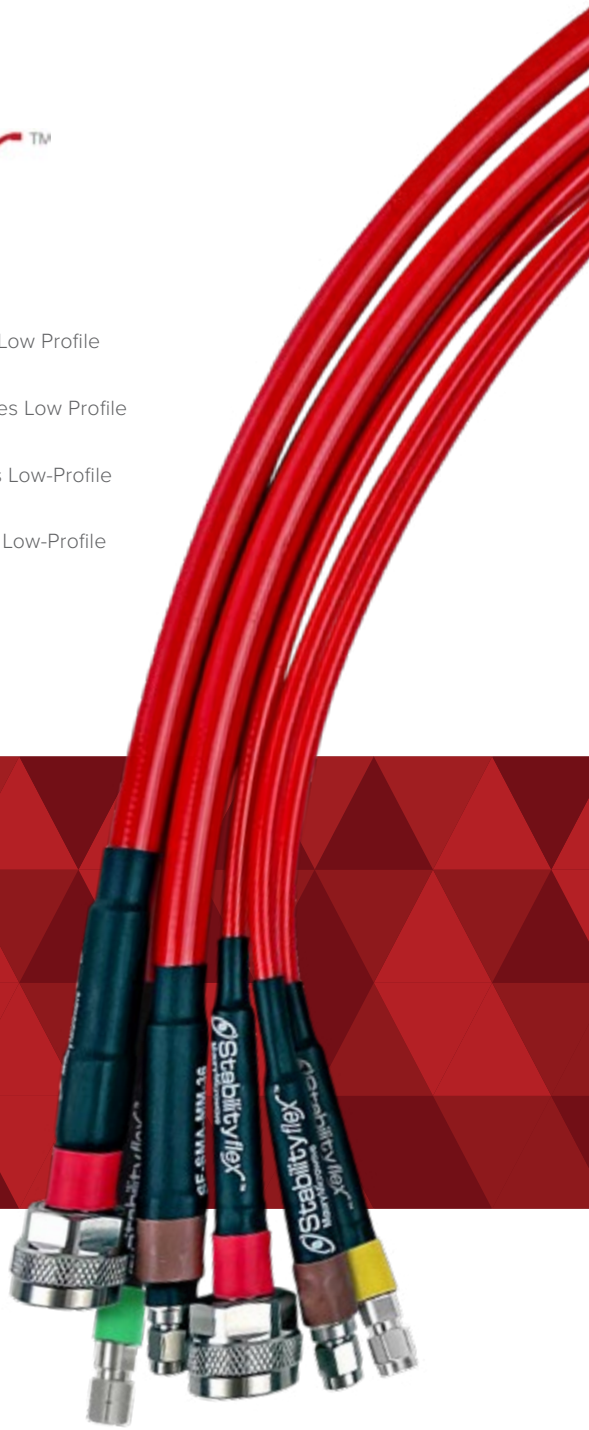
# StabilityFlex™ Microwave/RF Cable Assemblies

**DATA SHEET / 2Z-014**

MODELS:

SF-24 // 2.4mm color-coded StabilityFlex™ cables
SF-24-LP // 2.4mm color-coded StabilityFlex™ cables Low Profile
SF-292 // 2.92mm color-coded StabilityFlex™ cables
SF-292-LP // 2.92mm color-coded StabilityFlex™ cables Low Profile
SF-SMA // SMA color-coded StabilityFlex™ cables
SF-SMA-LP // SMA color-coded StabilityFlex™ cables Low-Profile
SF-N // Type N color-coded StabilityFlex™ cables
SF-N-LP // Type N color-coded StabilityFlex™ cables Low-Profile




Maury Microwave

// OCTOBER 2023

# StabilityFlex™ Microwave/RF Cable Assemblies

SERIES SF-24, SF-24-LP, SF-292, SF-292-LP, SF-SMA, SF-SMA-LP, SF-N, SF-N-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) | | | | | | | |

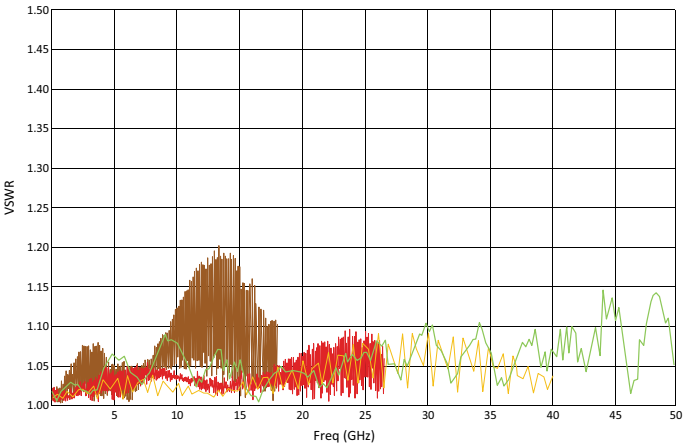
## Mechanical / Environmental Properties

| 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

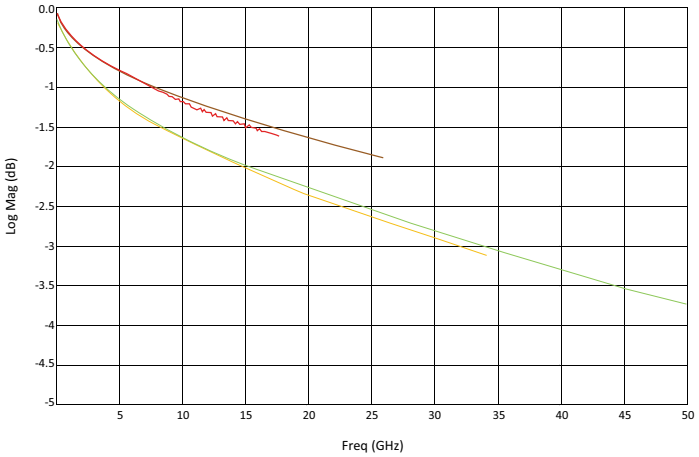
*Maury StabilityFlex™ 36" Cable Assembly Typical VSWR*

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




*Maury StabilityFlex™ 36" Cable Assembly Typical Insertion Loss*

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



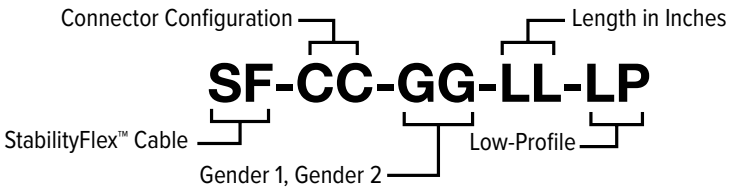

| CC | GG | LL (Standard Lengths)** | Options |
|---|---|---|---|
| N (Type N)*<br>SMA<br>292 (2.92mm)<br>24 (2.4mm) | MM (Male To Male)<br>MF (Male to Female)<br>FF (Female To Female) | 24<br>36<br>48<br>60<br>78 | Low-Profile |

** 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



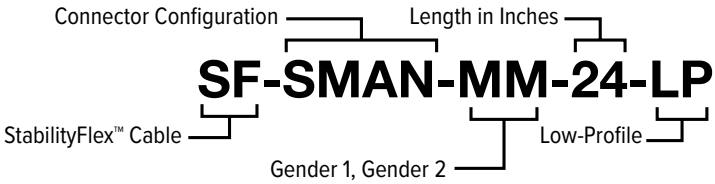

EXAMPLE:

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.



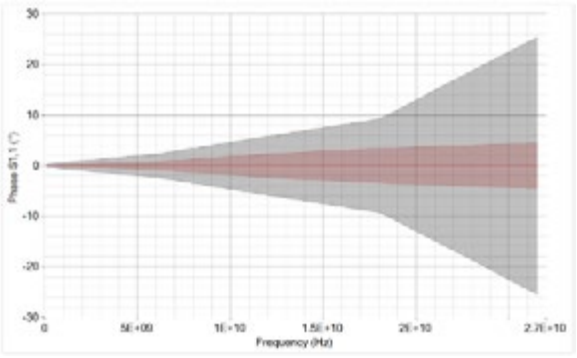
## S-parameter measurements with uncertainty

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.

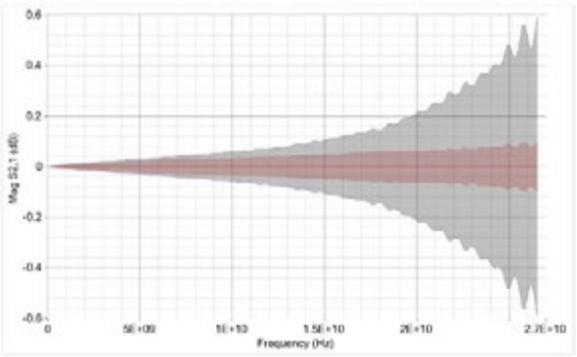
A better metric to understand a cable's impact on a DUT measurement is "uncertainty contribution". The cable's impact on measurement uncertainty can be calculated by moving the cable through a user's actual range of motion and recording the S-parameters across the movement. This technique has been thoroughly 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.

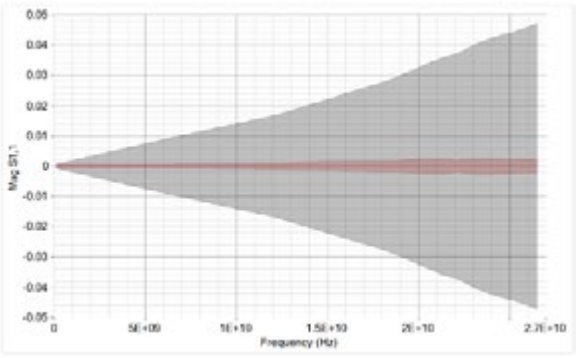
** https://www.maurymw.com/pdf/I-CAL-GUI-012.pdf*
*** https://www.maurymw.com/Precision/Insight_Software.php*




*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)

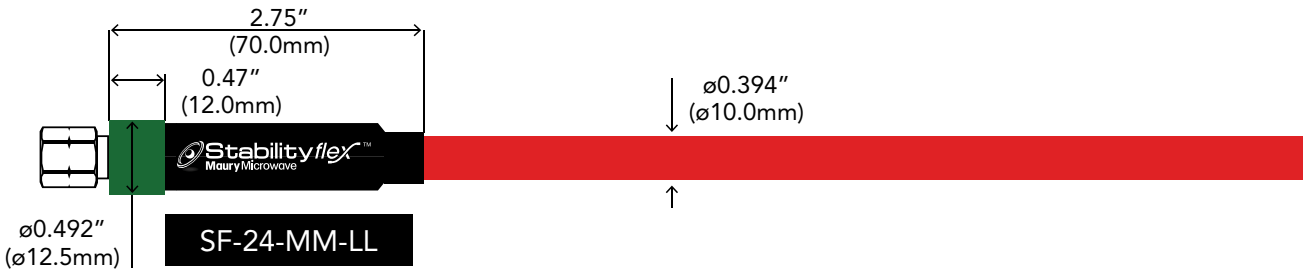
| Freq (GHz) | SF-24<br>SF-24-LP<br>(dB/100 ft) | SF-292<br>SF-292-LP<br>(dB/100 ft) | SF-SMA<br>SF-SMA-LP<br>(dB/100 ft) | SF-N<br>SF-N-LP<br>(dB/100 ft) |
|---|---|---|---|---|
| 1 | 17.72 | 17.72 | 11.73 | 11.73 |
| 2 | 25.38 | 25.38 | 17.04 | 17.04 |
| 4 | 36.55 | 36.55 | 25.00 | 25.00 |
| 6 | 45.39 | 45.39 | 31.47 | 31.47 |
| 8 | 53.01 | 53.01 | 37.16 | 37.16 |
| 12 | 66.16 | 66.16 | 47.21 | 47.21 |
| 18 | 82.88 | 82.88 | 60.37 | 60.37 |
| 26.5 | 103.18 | 103.18 | 76.85 | N/A |
| 40 | 130.95 | 130.95 | N/A | N/A |
| 50 | 149.36 | N/A | N/A | N/A |

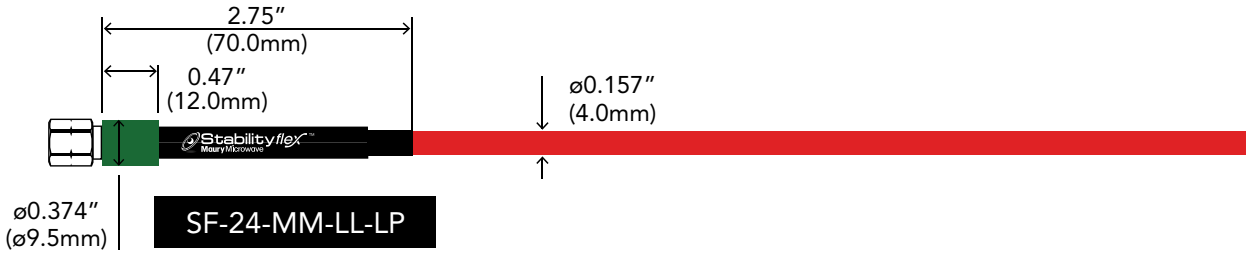
## Average Power Handling

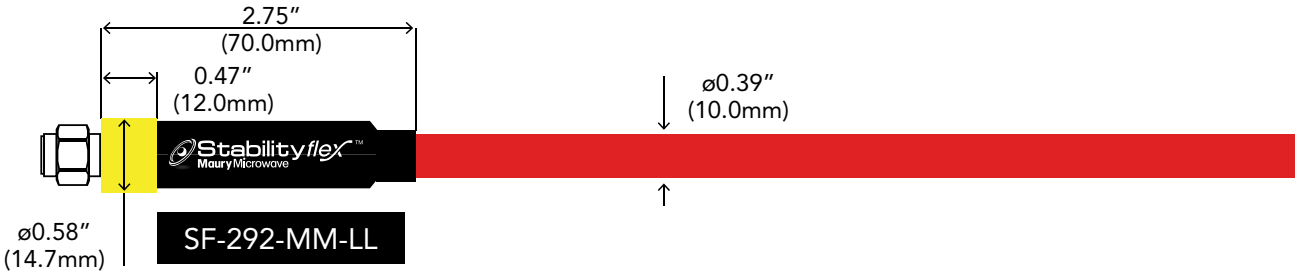
(1:1 VSWR, 25 C, Sea Level, Cable Only)

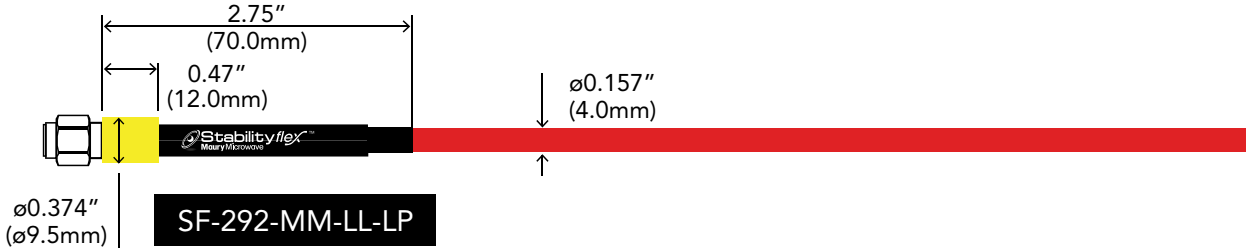
| Freq (GHz) | SF-24<br>SF-24-LP<br>Watts (Max) | SF-292<br>SF-292-LP<br>Watts (Max) | SF-SMA<br>SF-SMA-LP<br>Watts (Max) | SF-N<br>SF-N-LP<br>Watts (Max) |
|---|---|---|---|---|
| 1 | 108 | 108 | 149 | 149 |
| 2 | 75 | 75 | 102 | 102 |
| 4 | 52 | 52 | 70 | 70 |
| 6 | 42 | 42 | 55 | 55 |
| 8 | 36 | 36 | 47 | 47 |
| 12 | 29 | 29 | 37 | 37 |
| 18 | 23 | 23 | 29 | 29 |
| 26.5 | 19 | 19 | 23 | N/A |
| 40 | 15 | 15 | N/A | N/A |
| 50 | 13 | N/A | N/A | N/A |

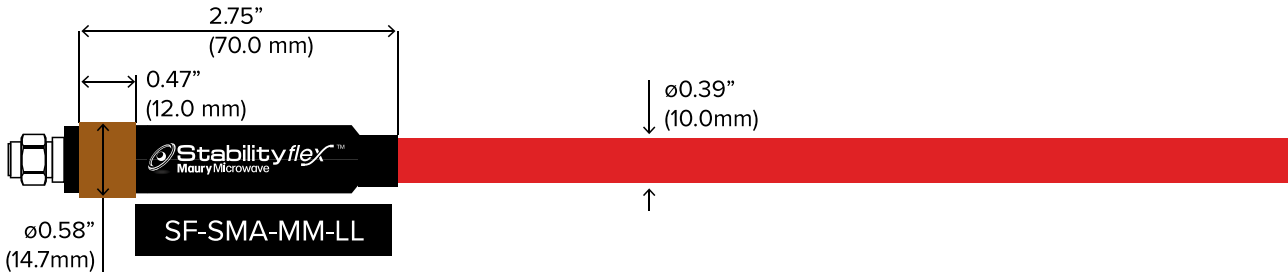
## StabilityFlex™
## Dimensions

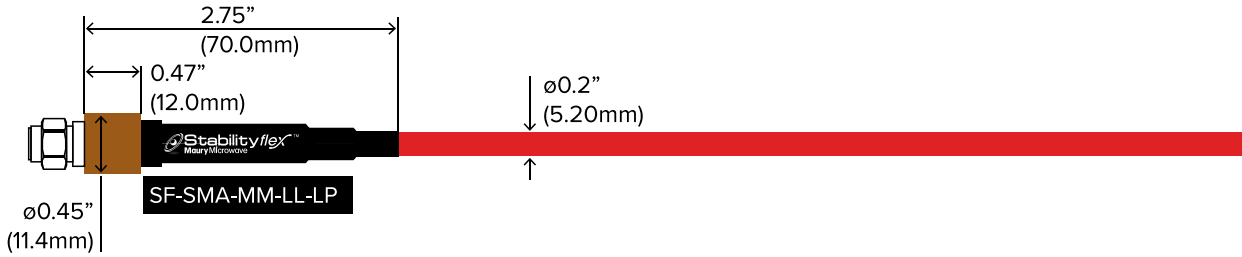


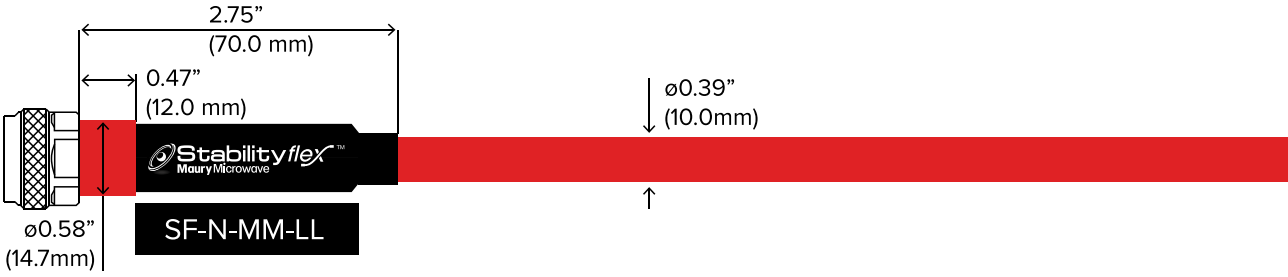



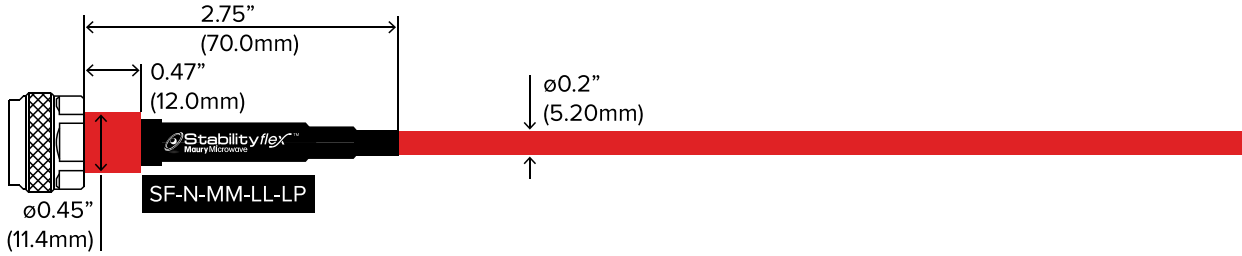




2.75”
(70.0 mm)
0.47”
(12.0 mm)
ø0.39”
(10.0mm)
ø0.58”
(14.7mm)
SF-SMA-MM-LL


2.75”
(70.0mm)
0.47”
(12.0mm)
ø0.2”
(5.20mm)
ø0.45”
(11.4mm)
SF-SMA-MM-LL-LP

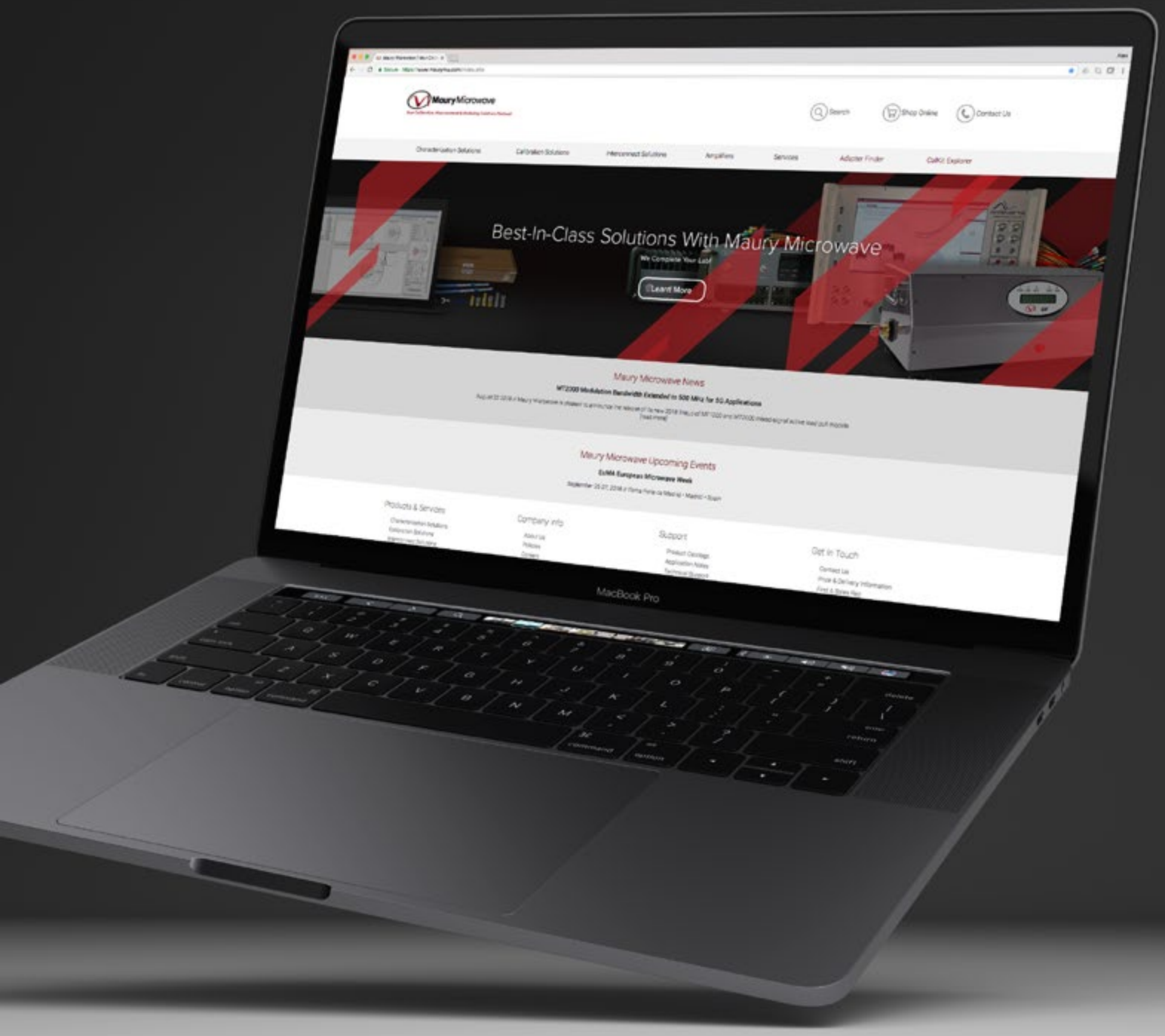

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ø0.45”
(11.4mm)
SF-N-MM-LL-LP

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