

StabilityTVAC™ Cable Assemblies

DATA SHEET / 2Z-012



MODELS:

- TV-292 // 2.92mm StabilityTVAC™ cables
- TV-292-LP // 2.92mm Low-Profile StabilityTVAC™ cables
- TV-SMA // SMA StabilityTVAC™ cables
- TV-SMA-LP // SMA Low-Profile StabilityTVAC™ cables
- TV-N-LL // Type N Low-Loss StabilityTVAC™ cables
- TV-N-LL-LP // Type N Low-Loss Low-Profile StabilityTVAC™ cables
- TV-SMA-LL // SMA Low-Loss StabilityTVAC™ cables
- TV-SMA-LL-LP // SMA Low-Loss Low-Profile StabilityTVAC™ cables
- TV-TNC-LL // TNC Low-Loss StabilityTVAC™ cables
- TV-TNC-LL-LP // TNC Low-Loss Low-Profile StabilityTVAC™ cables



A photograph of several StabilityTVAC cable assemblies. The cables are braided with a tan and black pattern. They feature black connectors with silver metal fittings. The text "StabilityTVAC" is printed on the black connector housing. The background is dark, making the cables stand out.

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
Maximum Frequency	40 GHz		26.5 GHz	
VSWR (typical)	1.25			
VSWR (maximum)	1.30			
Typical Insertion Loss (cable only)	0.672 dB/ft		0.537 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	≤600PPM			
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
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)
Maximum Outer Diameter (Cable)	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
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)
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)
0.5	6.8		6.8	
1	9.7		9.7	
1.5	12		12	
2	13.9		13.9	
3	17.1		17.1	
4	19.8		19.8	
5	22.2		22.2	
6	24.4		24.4	
8	28.4		28.4	
10	31.9		31.9	
12	35.1		35.1	
12.4	35.8		35.8	
13.5	37.4		37.4	
15	39.6		39.6	
18	43.6		43.6	
24	50.9		50.9	
26.5	53.7		53.7	
40	67.2		-	

Average Power Handling

Freq (GHz)	TV-292 Watts (Max)	TV-292-LP Watts (Max)	TV-SMA Watts (Max)	TV-SMA-LP Watts (Max)
0.5	726		726	
1	511		511	
1.5	415		415	
2	359		359	
3	291		291	
4	251		251	
5	224		224	
6	203		203	
8	175		175	
10	156		156	
12	141		141	
12.4	139		139	
13.5	133		133	
15	126		126	
18	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	≤600PPM					
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

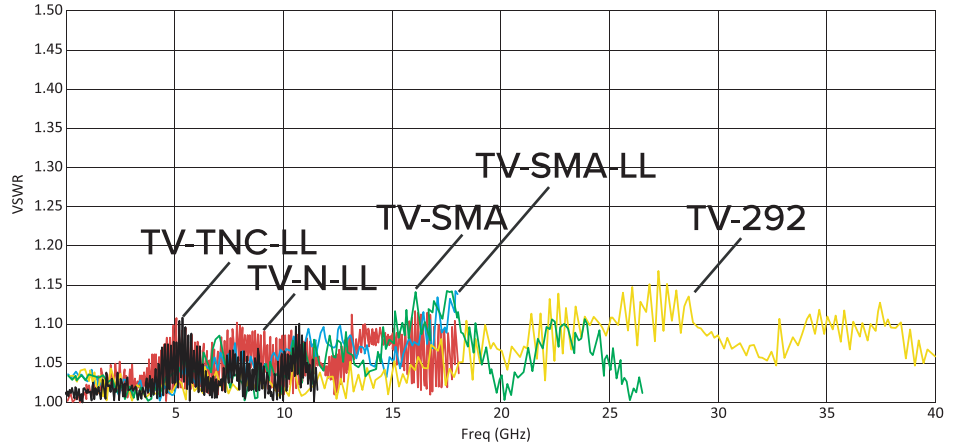
Freq (GHz)	TV-N-LL (db/100 ft)	TV-N-LL-LP (db/100 ft)	TV-SMA-LL (db/100 ft)	TV-SMA-LL-LP (db/100 ft)	TV-TNC-LL (db/100 ft)	TV-TNC-LL-LP (db/100 ft)
0.5	3.16		3.16			3.16
1	4.5		4.5			4.5
1.5	5.54		5.54			5.54
2	6.42		6.42			6.42
3	7.92		7.92			7.92
4	9.2		9.2			9.2
5	10.34		10.34			10.34
6	11.38		11.38			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			-

Max Insertion Loss/Attenuation

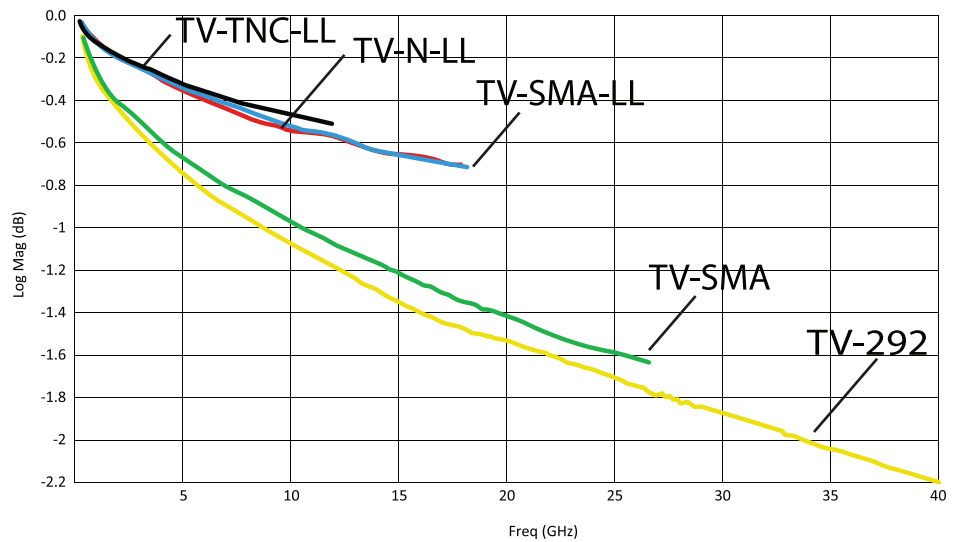
Freq (GHz)	TV-N-LL Watts (Max)	TV-N-LL-LP Watts (Max)	TV-SMA-LL Watts (Max)	TV-SMA-LL-LP Watts (Max)	TV-TNC-LL Watts (Max)	TV-TNC-LL-LP Watts (Max)
0.5	2579		2579			2579
1	1812		1812			1812
1.5	1472		1472			1472
2	1269		1269			1269
3	1029		1029			1029
4	886		886			886
5	789		789			789
6	717		717			717
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

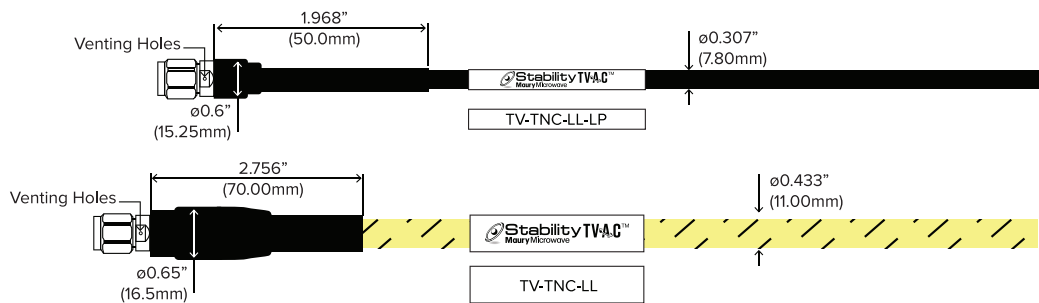
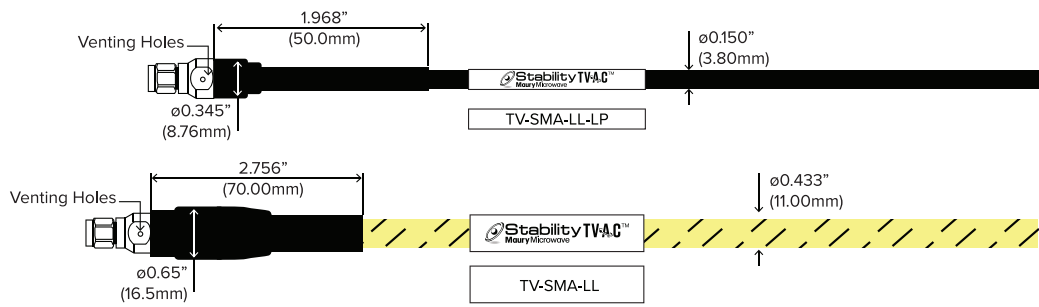
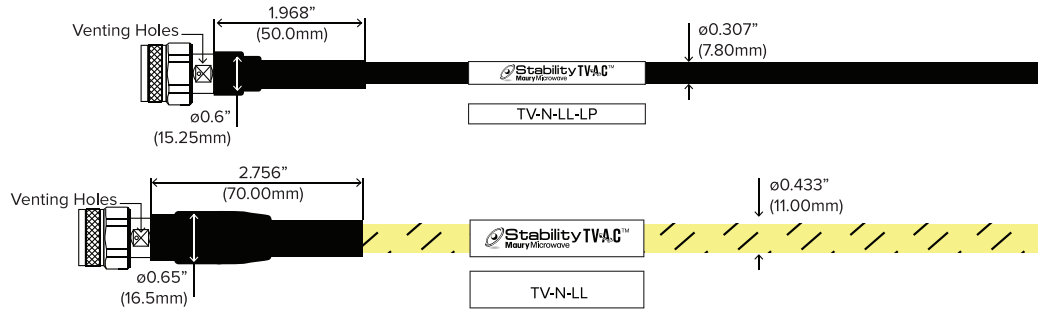
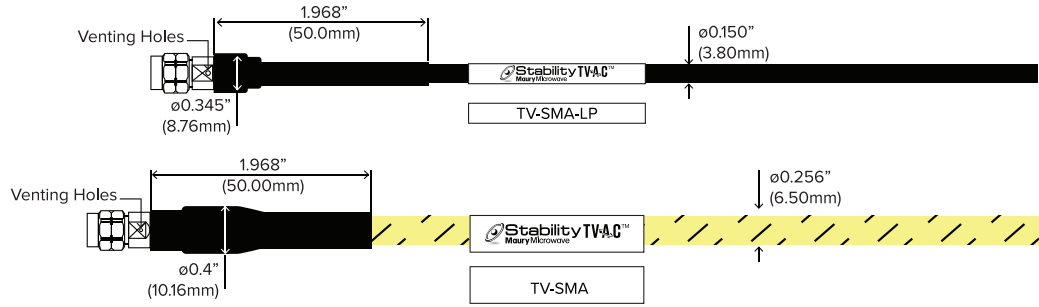
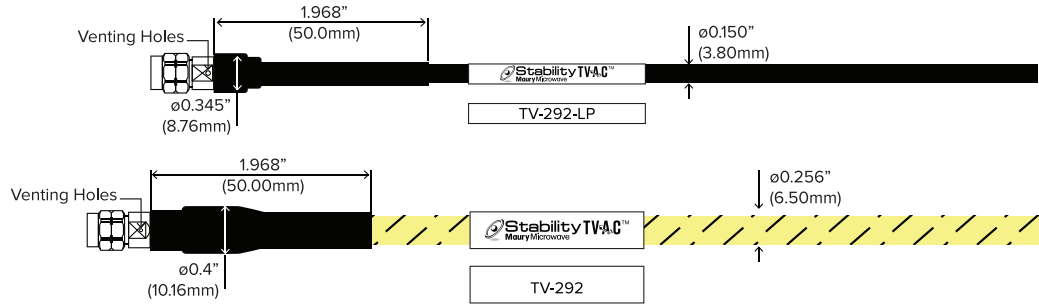
Maury StabilityTVAC™ 36" Cable
Assembly Typical VSWR



Maury StabilityTVAC™ 36" Cable
Assembly Typical Insertion Loss



StabilityTVAC™
Dimensions

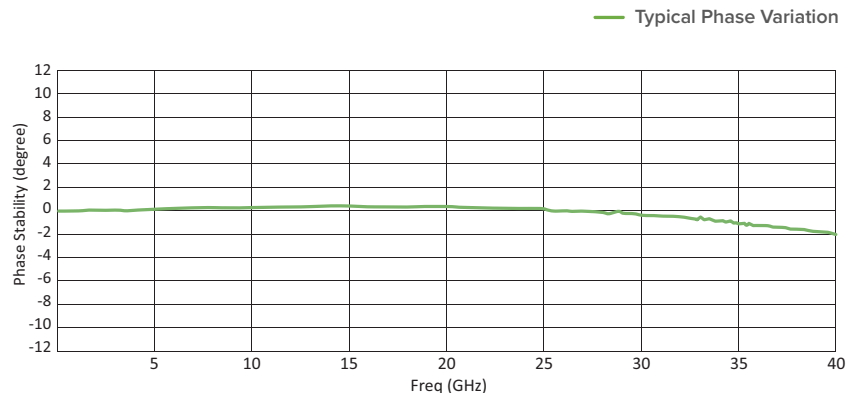


Phase Stability

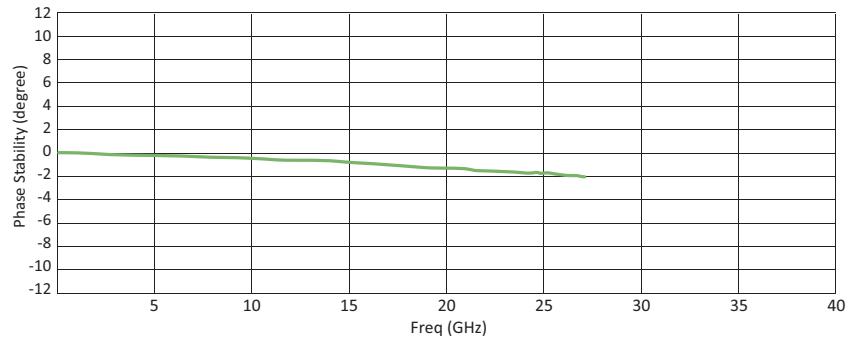
The maximum value for phase and amplitude stability was established using the following method. The cable was terminated with a short. With the cable in a straight position the VNA was normalized. The cable was then coiled 360° around a mandrel 4 inches in diameter counter-clockwise and held in position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

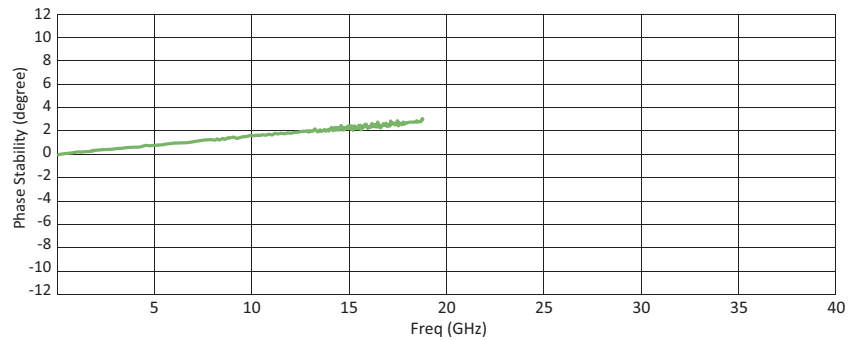
Exemplary data for TV-292



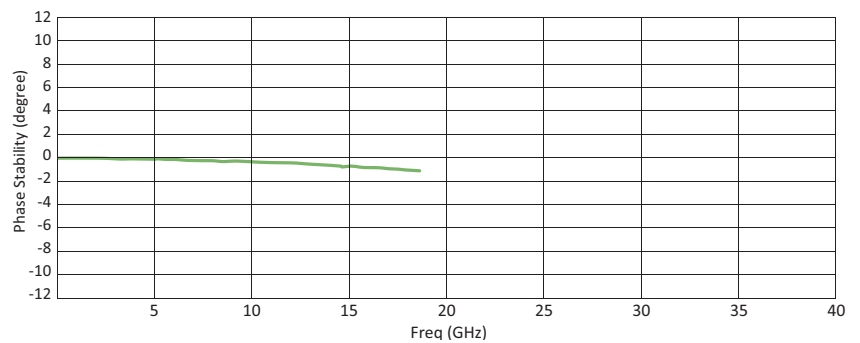
Exemplary data for TV-SMA



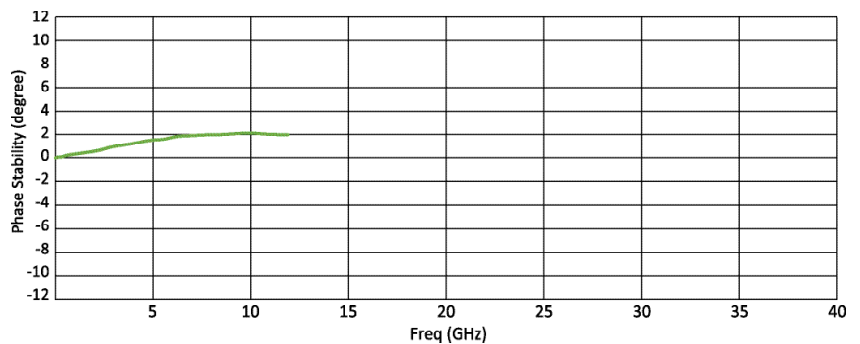
Exemplary data for TV-N-LL



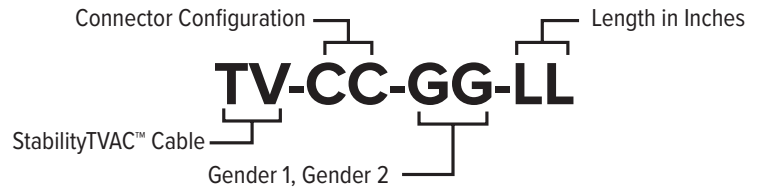
Exemplary data for TV-SMA-LL



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

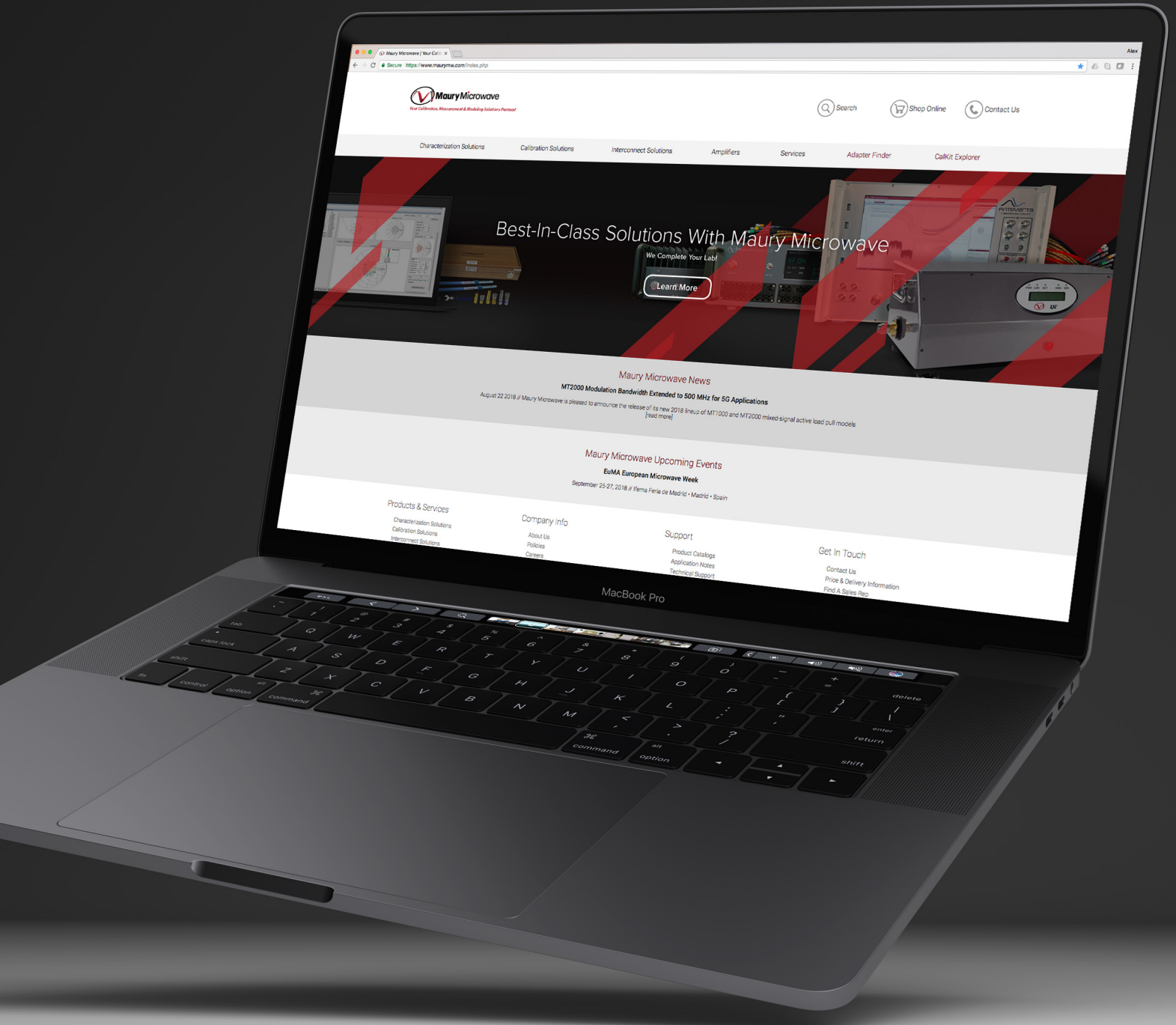


EXAMPLE:

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



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