GORE® Microwave/RF

ASSEMBLIES

Technical Note

Proving reliable performance with extremely small, flexible assemblies that survive routing in tight spaces

Standard semi-rigid cable assemblies commonly used in the industry are stiff and difficult to route in confined spaces, which can lead to frequent cable failure. And, they are difficult to replace — a problem that often requires costly configuration drawings and challenging installation procedures that are time-consuming.

Greater Flexibility with Stable Performance through Testing

Gore evaluated the flexibility and signal integrity of GORE® Microwave/RF Assemblies, Type 4L (size 0.057 inches) to determine whether performance changed or remained stable, specifically insertion loss and VSWR (Figure 1). Using a Performance Network Analyzer (PNA), Gore tested their brand new 12-inch assembly to determine the baseline. Next, the midpoint of the assembly was flexed at a 90-degree angle around a mandrel set to a 0.10-inch radius, and performance was recorded. The assembly was returned to its initial straight position with the PNA normalized, and the test was repeated next to the connector.

Results showed that GORE® Microwave/RF Assemblies, Type 4L successfully maintained low insertion loss and reliable VSWR up to 18 GHz during flexure (Figures 2 and 3). These assemblies also maintained electrical and mechanical integrity when flexed next to the connector — a common failure point for semi-rigid assemblies during installation. With this level of performance, Type 4L maintains a consistent impedance of 50 ± 1 ohms that meets industry standards, yet with a tighter tolerance (Figure 4).

Figure 1: Test Simulation

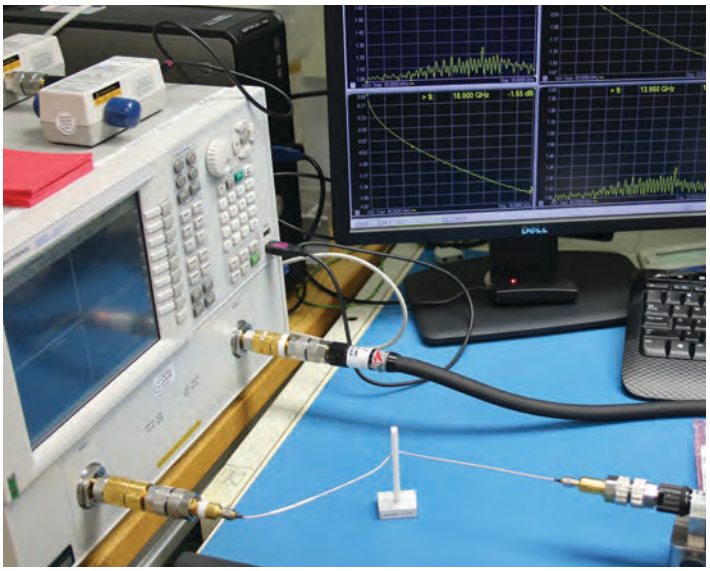

Figure 2: Insertion Loss Stability with Flexure at 18 GHz

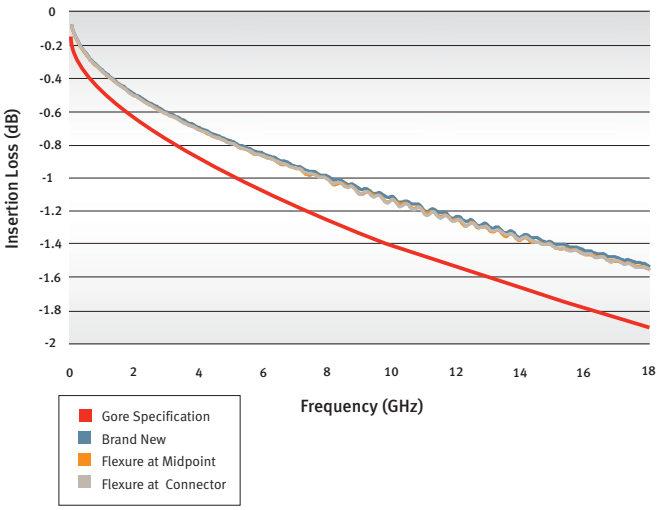

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Figure 3: VSWR Stability with Flexure at 18 GHz

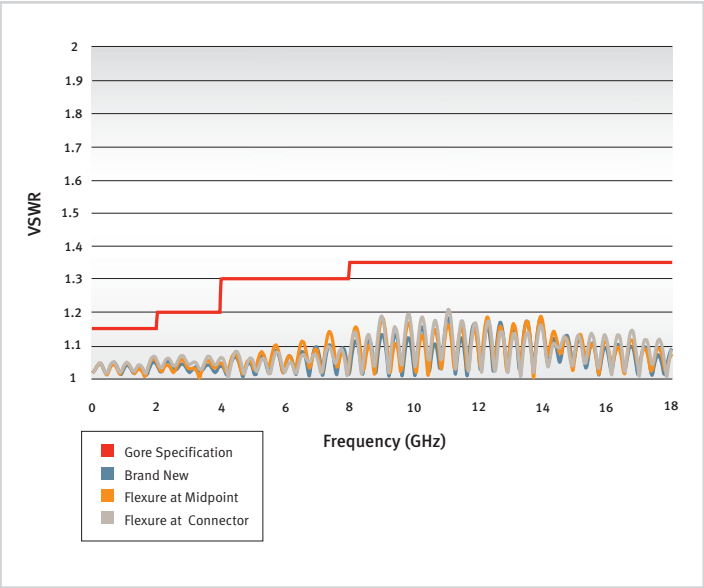
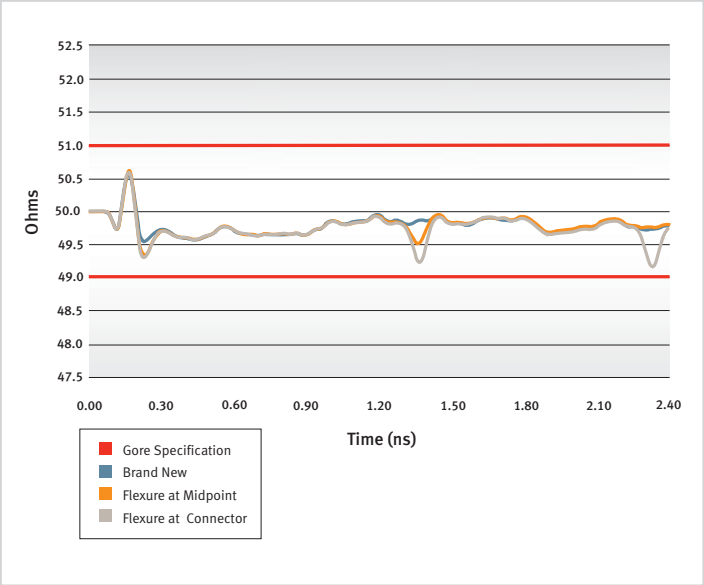
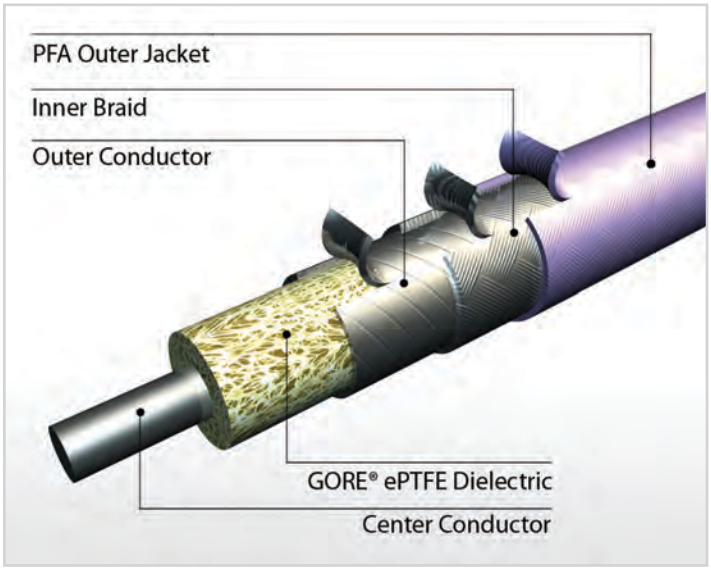


Figure 4: Controlled Impedance with Flexure



GORE® Microwave/RF Assemblies, Type 4L have a tight bend radius as small as 0.10 inches for easy routing in very small configurations such as inside-the-box systems (Table 1). In addition, they have a high-density construction that is more durable, yet lighter weight compared to semi-rigid assemblies (Figure 5).

Figure 5: High-Density Construction of GORE® Microwave/RF Assemblies, Type 4L



With proven flexibility, GORE® Microwave/RF Assemblies, Type 4L withstand the rigors of handling and installation while delivering reliable signal integrity for longer service life and lower total costs — making them an ideal replacement for semi-rigid assemblies.

Table 1: Product Specifications

	Property	Standard Semi-Rigid Cable Assemblies	GORE® Microwave/RF Assemblies, Type 4L
Electrical	Typical Attenuation at 18 GHz (dB/ft)	0.18	0.15
	Impedance (Nominal) (Ohms)	50	50 ± 1
	Velocity of Propagation (Nominal) (%)	70	82
	Shielding Effectiveness (dB through 18 GHz)	› 90	› 90
Mech/Env	Overall Diameter [mm (in)]	1.2 (0.047)	1.4 (0.057)
	Dielectric Material	Full Density PTFE	Expanded PTFE
	Nominal Weight (g/ft)	2.3	2.0
	Minimum Bend Radius [mm (in)]	1.3 (0.05)	2.5 (0.10)

Typical Applications

- Board-to-board systems
- Inside-the-box systems
- ATE systems (automated test equipment)
- Wafer probing
- Load boards
- Environmental test chambers
- Thermal vacuum chambers
- Telecommunication systems
- Optical modules
- Evaluation boards
- Antenna arrays
- Test bench systems
- Module-to-module interconnect
- Clock distribution

GORE® Microwave/RF Assemblies

For More Information

For more information regarding GORE® Microwave/RF Cables Assemblies, Type 4L or other cable types, or to discuss your specific applications needs, contact a Gore representative at electronics.usa@wlgore.com.

The GORE™ Microwave/RF Assembly Builder is a step-by-step tool that allows you to configure and request a quote for an assembly with different connector options, assembly lengths, and frequencies. For more information, visit www.gore.com/rfcablebuilder.

The GORE™ Microwave/RF Assembly Calculator is an online tool that calculates and compares the insertion loss, VSWR, and other parameters for various cable types. For more information, visit gore.com/gmcacalc.

Application Notes

NOTICE — USE RESTRICTIONS APPLY
Not for use in food, drug, cosmetic or medical device manufacturing, processing, or packaging operations.

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