

# PRODUCT SELECTION GUIDE

For 5G Test Systems

# Table of Contents

- Overview & Online Tools** ..... [1](#)
  - GORE® Microwave/RF Assembly Builder ..... [1](#)
  - GORE® Microwave/RF Assembly Calculator ..... [1](#)
- Electronic Test & Measurement Equipment: Network Analyzer** ..... [2](#)
  - GORE® PHASEFLEX® Microwave/RF Test Assemblies ..... [3](#)
  - GORE® VNA Microwave/RF Test Assemblies ..... [5](#)
- Electronic Test & Measurement Equipment: Signal Generator, Analyzer, One-Box Tester** ... [6](#)
  - GORE® PHASEFLEX® Microwave/RF Test Assemblies ..... [7](#)
  - GORE® Microwave/RF Test Assemblies, General Purpose ..... [7](#)
- Electronic Test & Measurement Equipment: High-Speed Digital Oscilloscope, BERT** ..... [9](#)
  - GORE® PHASEFLEX® Microwave/RF Test Assemblies ..... [10](#)
  - GORE® Microwave/RF Test Assemblies, General Purpose ..... [12](#)
- Communication Test Systems: Base Station, Antenna, RF Components/Modules**..... [14](#)
  - GORE® PHASEFLEX® Microwave/RF Test Assemblies ..... [15](#)
  - GORE® Microwave/RF Test Assemblies, General Purpose ..... [15](#)
- Semiconductor Wafer Test Systems: Load Board, Wafer Probe** ..... [17](#)
  - GORE® Microwave/RF Test Assemblies, General Purpose ..... [18](#)
- Semiconductor Package Test Systems** ..... [22](#)
  - GORE® PHASEFLEX® Microwave/RF Test Assemblies ..... [23](#)
  - GORE® Microwave/RF Test Assemblies, General Purpose ..... [25](#)

# Improve 5G test outcomes with reliable cable assembly performance

The 5G test industry requires reliable microwave/RF cable assemblies to help improve test outcomes. These cable assemblies are an integral part of 5G test systems and play a significant role in ensuring test reliability and measurement accuracy. Selecting a reliable, high-performing microwave/RF cable assembly can eliminate many of the common problems associated with test systems.

Gore has a proven track record and extensive experience working with leading OEMs and RF component manufacturers for 5G test systems. We have developed a guide to assist engineers in selecting the right cable type for their specific test system. This guide includes our specific microwave/RF cables that meet the critical requirements of 5G test systems.

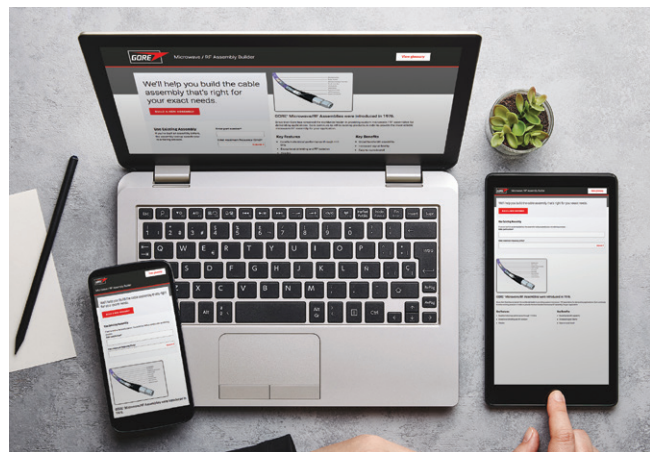
For more information about our full line of microwave/RF cable assemblies for test and measurement applications, visit [gore.com/test](https://gore.com/test) or contact a [Gore representative](#).

## Online Tools

We have also developed tools to help you calculate and build an assembly that is right for your exact application needs. Whether you are on your desktop, tablet, or mobile phone, you can design a microwave/RF cable assembly with ease.

The **GORE® Microwave/RF Assembly Builder** allows you to configure and request a quote for an assembly with a variety of connector options, assembly lengths and frequencies. For more information and to get started, visit our [cable builder](#).

The **GORE® Microwave/RF Assembly Calculator** allows you to calculate and compare the insertion loss, VSWR and other parameters for various cable types. For more information and to get started, visit our [cable calculator](#).



# Electronic Test & Measurement Equipment

## Network Analyzer

System Performance Requirements	Gore Cable Assembly Values
Measurement Accuracy	Precise, repeatable measurements from DC through 110 GHz
Stability Reproducibility/Repeatability	Excellent phase/amplitude stability over flexure and temperature
High Dynamic Range	<ul style="list-style-type: none"> <li>• Low insertion loss</li> <li>• Excellent VSWR</li> </ul>
Handling/Operation	<ul style="list-style-type: none"> <li>• Proven high flex life</li> <li>• Low spring back</li> <li>• Mechanical durability</li> </ul>



Image courtesy of Keysight Technologies, Inc.

**GORE® PHASEFLEX® Microwave/RF Test Assemblies connected to Keysight M9804A Multiport Test System.**

**GORE® PHASEFLEX® Microwave/RF Test Assemblies connected to R&S®ZVA Vector Network Analyzer.**

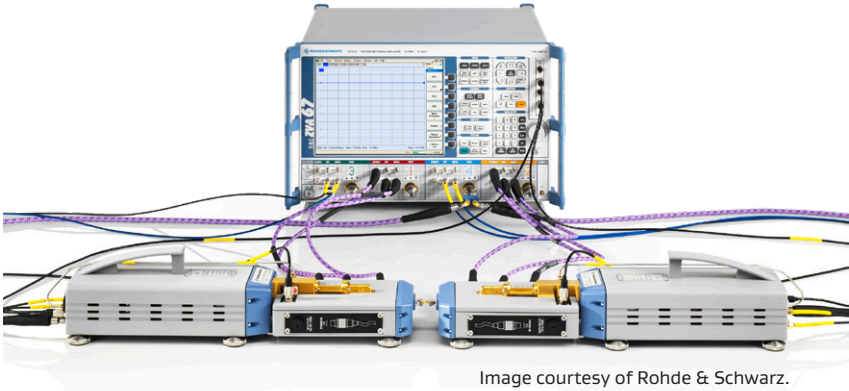


Image courtesy of Rohde & Schwarz.



# Electronic Test & Measurement Equipment

## Network Analyzer



We selected specific cable types of our test assemblies with connector options that meet the critical requirements of network analyzers (Tables 1 and 2). For more information, visit the product websites below or contact a [Gore representative](#).

- [GORE® PHASEFLEX® Microwave/RF Test Assemblies](#)
- [GORE® PHASEFLEX® Microwave/RF Test Assemblies, Type ON](#)

## Typical Applications

General research and development (R&D) and mass production applications.

- Mass production: Flex life is critical
- Multi-port/VNA: Overall diameter (OD) is critical
- VNA: Stability is critical

**Table 1: Selected Gore Cable Types**

## Electrical Properties<sup>1</sup>

Gore Cable Type	GORE® PHASEFLEX® Microwave/RF Test Assemblies			
	OT	ON	OF	CX
Maximum Frequency (GHz)	26.5	40 / 50	70	110
Typical VSWR	1.17:1	1.25:1	1.30:1	1.34:1
Typical Insertion Loss (dB)	1.71	3.21 / 3.67	5.99	2.14
Typical Phase Stability <sup>2</sup> (Degree)	± 3.0	± 5.0 / ± 6.0	± 8.0	± 1.0
Typical Amplitude Stability <sup>2</sup> (dB)	< ± 0.05	< ± 0.05	< ± 0.05	< ± 0.05

## Mechanical/Environmental Properties

Gore Cable Type	OT	ON	OF	CX
Center Conductor	Stranded	Solid	Solid	Solid
Overall Diameter mm (in)	8.0 (0.315)	5.3 (0.210)	5.8 (0.230)	4.2 (0.167)
Nominal Weight g/m (g/ft)	147.6 (45)	68.9 (21)	88.6 (27)	55.8 (17)
Minimum Bend Radius mm (in)	25.4 (1.0)	25.4 (1.0)	25.4 (1.0)	10.2 (0.40)
Typical Flex Cycles <sup>3</sup>	100,000	12,500	20,000	—
Temperature Range (°C)	-55 to 125	-55 to 125	-55 to 75	-55 to 125
Crush Resistance kgf/cm (lbf/in)	44.6 (250)	33.5 (187)	44.6 (250)	44.6 (250)

1. Electrical specifications for Types OT/ON/OF are based on a 0.9 m (36 in) assembly length and maximum frequency with straight connectors. Type CX is based on a 16 cm (6.3 in) assembly length.

2. Types OT/ON/OF are wrapped 360° around a 57 mm (2.25 in) radius mandrel. Type CX is wrapped 90° around a 25.4 mm (1 in) radius mandrel.

3. When bent ± 90° at a radius that is twice the minimum bend radius, test assembly performs reliably through the stated flex cycles.

# Electronic Test & Measurement Equipment

## Network Analyzer

**Table 2: Connector Options<sup>1</sup>**

		GORE® PHASEFLEX® Microwave/RF Test Assemblies			
Connector Type	Maximum Frequency <sup>2</sup> (GHz)	OT	ON	OF	CX
		26.5	50	70	110
3.5 mm Male	26.5	D01	D01		
3.5 mm Female	26.5	D02	D02		
2.92 mm Male	40		OCQ		
2.92 mm Female	40		OCP		
2.4 mm Male	50		OCJ		
2.4 mm Female	50		OCK		
1.85 mm Male	70			OCB	
1.85 mm Female	70			OCA	
1.0 mm Male	110				OAB
1.0 mm Female	110				OAA

1. Includes the most commonly used connectors. For more options, please contact a [Gore representative](#).

2. The maximum operating frequency of a test assembly is determined as the lowest frequency of either the connectors or the cable.

# Electronic Test & Measurement Equipment

## Network Analyzer

We selected specific cable types of our test assemblies that meet the critical requirements of network analyzers (Table 3). For more information, visit the product website below or contact a [Gore representative](#).

- [GORE® VNA Microwave/RF Test Assemblies](#)

### Typical Applications

- High-end research and development (R&D)
- Metrology
- Critical performance: Highest stability

**Table 3: Selected Gore Cable Types**

NMD connectors (3.5 mm, 2.4 mm, 1.85 mm) are available upon request. For more connector options or more information, please contact a [Gore representative](#).

### Electrical Properties<sup>1</sup>

Gore Cable Type	GORE® VNA Microwave/RF Test Assemblies			
	FB	FD	FE	FF
Maximum Frequency (GHz)	26.5	40	50	70
Typical (VSWR)	1.20:1	1.25:1	1.25:1	1.35:1
Typical Insertion Loss (dB)	1.26	2.64	2.62	5.15
Typical Phase Stability <sup>2</sup> (Degree)	± 2.0	± 1.5	± 1.5	± 5.0
Typical Amplitude Stability <sup>2</sup> (dB)	< ± 0.01	< ± 0.02	< ± 0.01	< ± 0.02

### Mechanical/Environmental Properties

Gore Cable Type	FB	FD	FE	FF
Center Conductor	Stranded	Solid	Solid	Solid
Overall Diameter mm (in)	15.2 (0.6)	15.2 (0.6)	15.2 (0.6)	15.2 (0.6)
Nominal Weight g/m (g/ft)	295.3 (3.2)	295.3 (3.2)	295.3 (3.2)	295.3 (3.2)
Minimum Bend Radius mm (in)	57.2 (2.25)	57.2 (2.25)	57.2 (2.25)	57.2 (2.25)
Typical Flex Cycles	100,000	50,000	50,000	50,000
Temperature Range (°C)	23 ± 5	23 ± 5	23 ± 5	23 ± 5
Crush Resistance kgf/cm (lbf/in)	143 (800)	143 (800)	143 (800)	143 (800)

1. Electrical specifications are based on a 0.6 m (25 in) assembly length.

2. The assembly is terminated with a short circuit and tested on a calibrated system. A mandrel of 2.25-inch radius is placed midway down the assembly on either side. The assembly is bent 180 degrees around the mandrel, forming a "U" shape. The assembly is held in this position for one full sweep. Maximum deviation over the frequency range of analysis is noted. The assembly is then returned to its straight position, and the VNA is renormalized. The mandrel is placed on the opposite side of the assembly and the test is repeated.



**GORE® VNA Microwave/RF Test Assemblies set the industry standard for vector network analyzers through 70 GHz.**

# Electronic Test & Measurement Equipment

Signal Generator, Analyzer, One-Box Tester

System Performance Requirements	Gore Cable Assembly Values
Measurement Accuracy	<ul style="list-style-type: none"><li>• Precise, repeatable measurements from DC through 110 GHz</li><li>• Low insertion loss</li><li>• Excellent VSWR</li></ul>
Stability Reproducibility/Repeatability	Excellent phase/amplitude stability over flexure and temperature
Handling/Operation	<ul style="list-style-type: none"><li>• Proven high flex life</li><li>• Low spring back</li><li>• Mechanical durability</li></ul>



Image courtesy of Keysight Technologies, Inc.

**GORE® PHASEFLEX® Microwave/RF Test Assemblies connected to Keysight Multi-Channel 5G Test Bed for NR FR1 and FR2.**



# Electronic Test & Measurement Equipment

## Signal Generator, Analyzer, One-Box Tester

We selected specific cable types of our test assemblies with connector options that meet the critical requirements of signal generators, analyzers, and one-box testers (Tables 4 and 5). For more information, visit the product websites below or contact a [Gore representative](#).

- [GORE® PHASEFLEX® Microwave/RF Test Assemblies](#)
- [GORE® PHASEFLEX® Microwave/RF Test Assemblies, Type ON](#)
- [GORE® Microwave/RF Test Assemblies, General Purpose](#)



## Typical Applications

- One-box testers: Overall diameter (OD) is critical
- Production: Flex life is critical
- Signal generators/analyzers: Insertion loss is critical

**Table 4: Selected Gore Cable Types**

### Electrical Properties<sup>1</sup>

Gore Cable Type	GORE® PHASEFLEX® Microwave/RF Test Assemblies					GORE® Microwave/ RF Test Assemblies, General Purpose	
	OS	OR	ON	OZ	OF	G5	4Y
Maximum Frequency (GHz)	18	26.5	50	50	70	18	40
Typical VSWR	1.19:1	1.17:1	1.25:1	1.26:1	1.30:1	1.19:1	1.30:1
Typical Insertion Loss (dB)	1.36	1.71	3.67	3.80	5.99	1.13	2.65
Typical Phase Stability (Degree)	± 2.0	± 3.0	± 6.0	± 6.0	± 8.0	± 2.0	± 5.0
Typical Amplitude Stability (dB)	< ± 0.05	< ± 0.05	< ± 0.05	< ± 0.05	< ± 0.05	< ± 0.05	< ± 0.05

### Mechanical/Environmental Properties

Gore Cable Type	OS	OR	ON	OZ	OF	G5	4Y
Center Conductor	Stranded	Stranded	Solid	Solid	Solid	Solid	Solid
Overall Diameter mm (in)	7.7 (0.305)	7.7 (0.305)	5.3 (0.210)	6.1 (0.240)	5.8 (0.230)	4.8 (0.190)	3.8 (0.150)
Nominal Weight g/m (g/ft)	147.6 (45)	147.6 (45)	68.9 (21)	101.7 (31)	88.6 (27)	52.5 (16)	36.1 (11)
Minimum Bend Radius mm (in)	25.4 (1.0)	25.4 (1.0)	25.4 (1.0)	25.4 (1.0)	25.4 (1.0)	25.4 (1.0)	25.4 (1.0)
Typical Flex Cycles	100,000	100,000	12,500	20,000	20,000	—	—
Temperature Range (°C)	-55 to 125	-55 to 125	-55 to 125	-55 to 75	-55 to 75	-55 to 125	-55 to 125
Crush Resistance kgf/cm (lbf/in)	44.6 (250)	44.6 (250)	33.5 (187)	44.6 (250)	44.6 (250)	—	—

1. The electrical specifications in this table are based on a 0.91 m (36 in) assembly length and maximum frequency with straight connectors.

# Electronic Test & Measurement Equipment

Signal Generator, Analyzer, One-Box Tester

Table 5: Connector Options<sup>1</sup>

Connector Type	Maximum Frequency <sup>2</sup> (GHz)	GORE® PHASEFLEX® Microwave/RF Test Assemblies					GORE® Microwave/ RF Test Assemblies, General Purpose	
		OS	OR	ON	OZ	OF	G5	4Y
		18	26.5	50	50	70	18	40
SMA Male	18	R01		R01			R01	R01
Type N Male	18	N01					N01	
Precision N Male (Instrument Grade)	18	Q01		Q01				
3.5 mm Male	26.5	D01	D01	D01			D01	
3.5 mm Female	26.5	D02	D02	D02			D02	
2.92 mm Male	40			OCQ	OCQ			OCQ
2.92 mm Female	40			OCP	OCP			OCP
2.4 mm Male	50			OCJ	OCJ			OCJ
2.4 mm Female	50			OCK	OCK			OCK
1.85 mm Male	70					OCB		
1.85 mm Female	70					OCA		

1. Includes the most commonly used connectors. For more options, please contact a [Gore representative](#).

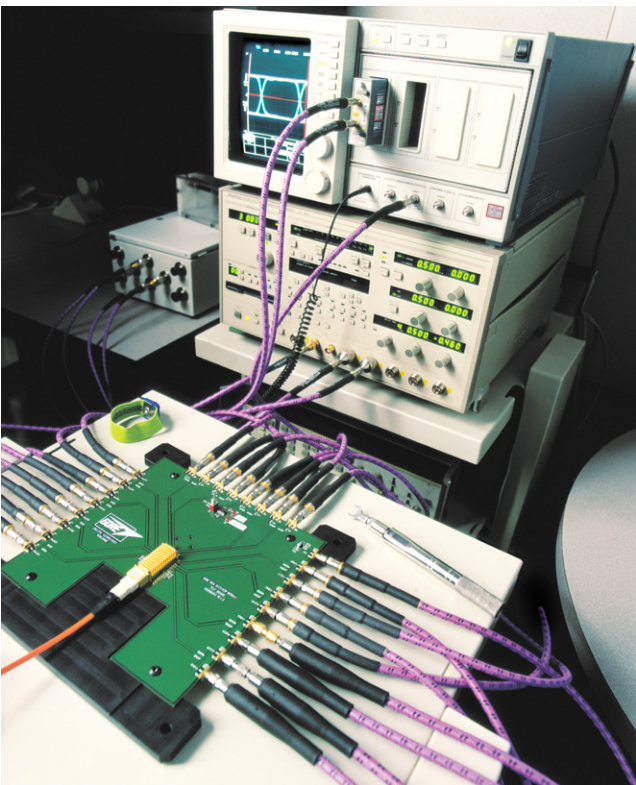
2. The maximum operating frequency of a test assembly is determined as the lowest frequency of either the connectors or the cable.

# Electronic Test & Measurement Equipment

## High-Speed Digital Oscilloscope, BERT

System Performance Requirements	Gore Cable Assembly Values
Measurement Accuracy	<ul style="list-style-type: none"><li>• Precise, repeatable measurements from DC through 110 GHz</li><li>• Low insertion loss*</li><li>• Amplitude stability</li></ul>
Stability Reproducibility/Repeatability	<ul style="list-style-type: none"><li>• Excellent phase/amplitude stability over flexure</li><li>• Absolute/relative phase matching from DC through 70 GHz</li><li>• Absolute/relative time delay matching to sub-picosecond tolerances</li></ul>
Handling/Operation	<ul style="list-style-type: none"><li>• Proven high flex life</li><li>• Low spring back</li><li>• Mechanical durability</li></ul>

\* Insertion loss is critical because cable assemblies’ insertion loss generates inter-symbol interference (ISI) in high-speed digital systems.



**GORE® PHASEFLEX® Microwave/RF Test Assemblies**  
connected to lab test equipment and FO module.

# Electronic Test & Measurement Equipment

## High-Speed Digital Oscilloscope, BERT



We selected specific cable types of our test assemblies with connector options that meet the critical requirements of high-speed digital oscilloscopes and BERT (Tables 6 and 7). For more information, visit the product websites below or contact a [Gore representative](#).

- [GORE® PHASEFLEX® Microwave/RF Test Assemblies](#)
- [GORE® PHASEFLEX® Microwave/RF Test Assemblies, Type ON](#)

### Typical Applications

- Frequent flex operation
- High-density interconnections: Overall diameter (OD) is critical
- High-speed digital test applications: Insertion loss, phase matching and time delay are critical

**Table 6: Selected Gore Cable Types**

### Electrical Properties<sup>1</sup>

Gore Cable Type	GORE® PHASEFLEX® Microwave/RF Test Assemblies		
	ON	OF	CX
Maximum Frequency (GHz)	40 / 50	70	110
Typical VSWR	1.25:1	1.30:1	1.34:1
Typical Insertion Loss (dB)	3.21 / 3.67	5.99	2.14
Typical Phase Stability <sup>2</sup> (Degree)	± 5.0 / ± 6.0	± 8.0	± 1.0
Typical Amplitude Stability <sup>2</sup> (dB)	< ± 0.05	< ± 0.05	< ± 0.05

### Mechanical/Environmental Properties

Gore Cable Type	ON	OF	CX
Center Conductor	Solid	Solid	Solid
Overall Diameter mm (in)	5.3 (0.210)	5.8 (0.230)	4.2 (0.167)
Nominal Weight g/m (g/ft)	68.9 (21)	88.6 (27)	55.8 (17)
Minimum Bend Radius mm (in)	25.4 (1.0)	25.4 (1.0)	10.2 (0.40)
Typical Flex Cycles	12,500	20,000	—
Temperature Range (°C)	-55 to 125	-55 to 75	-55 to 125
Crush Resistance kgf/cm (lbf/in)	33.5 (187)	44.6 (250)	44.6 (250)

1. Electrical specifications are based on a 0.9 m (36 in) assembly length and maximum frequency with straight connectors. Type CX is based on a 16 cm (6.3 in) assembly length.

2. Wrapped 360° around a 57 mm (2.25 in) radius mandrel. Type CX is wrapped 90° around a 25.4 mm (1 in) radius mandrel.

# Electronic Test & Measurement Equipment

## High-Speed Digital Oscilloscope, BERT

**Table 7: Connector Options<sup>1</sup>**

		GORE® PHASEFLEX® Microwave/RF Test Assemblies		
Connector Type	Maximum Frequency <sup>2</sup> (GHz)	ON	OF	CX
		50	70	110
SMA Male	18	R01		
3.5 mm Male	26.5	D01		
3.5 mm Female	26.5	D02		
2.92 mm Male	40	OCQ		
2.92 mm Female	40	OCP		
2.4 mm Male	50	OCJ		
2.4 mm Female	50	OCK		
1.85 mm Male	70		OCB	
1.85 mm Female	70		OCA	
1.0 mm Male	110			OAB
1.0 mm Female	110			OAA

1. Includes the most commonly used connectors. For more options, please contact a [Gore representative](#).

2. The maximum operating frequency of a test assembly is determined as the lowest frequency of either the connectors or the cable.



# Electronic Test & Measurement Equipment

## High-Speed Digital Oscilloscope, BERT

We selected specific cable types of our test assemblies with connector options that meet the critical requirements of high-speed digital oscilloscopes and BERT (Tables 8 and 9). For more information, visit the product website below or contact a [Gore representative](#).

- [GORE® Microwave/RF Test Assemblies, General Purpose](#)

### Typical Applications

- Handling/operation: No flex or movement
- High-density interconnections: Overall diameter (OD) is critical
- High-speed digital test applications: Insertion loss, phase matching, and time delay are critical

**Table 8: Selected Gore Cable Types**

### Electrical Properties<sup>1</sup>

**GORE® Microwave/RF Test Assemblies, General Purpose**

Gore Cable Type	89	4Y	2Z	54 / 55	4F
Maximum Frequency (GHz)	40	40	50	40 / 70	70
Typical VSWR	1.40:1	1.30:1	1.26:1	1.33:1 / 1.40:1	1.30:1
Typical Insertion Loss (dB)	1.60	2.65	3.80	1.93 / 2.69	5.99
Typical Phase Stability (Degree)	—	± 5.0	± 6.0	—	± 8.0
Typical Amplitude Stability (dB)	—	< ± 0.05	< ± 0.05	—	< ± 0.05

### Mechanical/Environmental Properties

Gore Cable Type	89	4Y	2Z	54 / 55	4F
Center Conductor	Solid	Solid	Solid	Solid	Solid
Overall Diameter mm (in)	2.2 (0.085)	3.8 (0.150)	3.6 (0.140)	1.8 (0.070)	3.0 (0.120)
Nominal Weight g/m (g/ft)	16.4 (5)	36.1 (11)	29.5 (9)	13.1 (4)	29.5 (9)
Minimum Bend Radius mm (in)	12.7 (0.5)	25.4 (1.0)	25.4 (1.0)	10.2 (0.4)	12.7 (0.5)
Temperature Range (°C)	-55 to 125	-55 to 125	-55 to 125	-55 to 125	-55 to 125

1. Electrical specifications for Types 4Y/2Z/4F are based on a 0.9 m (36 in) assembly length and maximum frequency with straight connectors. Types 89/54/55 is based on a 0.3 m (12 in) assembly length and maximum frequency with straight connectors.

# Electronic Test & Measurement Equipment

## High-Speed Digital Oscilloscope, BERT

**Table 9: Connector Options<sup>1</sup>**

		GORE® Microwave/RF Test Assemblies, General Purpose					
Connector Type	Maximum Frequency <sup>2</sup> (GHz)	54	89	4Y	2Z	55	4F
		40	40	40	50	70	70
SMA Male	18	S01	S01	R01			
SMP Bulkhead Full Detent Male	26.5		ZT4				
SMP Bulkhead Smooth Bore Male	26.5		ZKT				
SMP Bulkhead Ultra Smooth Bore Male	26.5		ZUJ				
SMP Float Mount Modified Full Detent Male	26.5		ZQF				
SMP Female	26.5	ZT8	ZT8				
SMPM Full Detent Male	40	ZU2					
SMPM Smooth Bore Male	40		ZUK				
2.92 mm Male	40	OCX	OCQ	OCQ			
2.92 mm Female	40	OC2		OCP	OBP		
2.4 mm Male	50	OCY		OCJ	OAJ	OCY	
2.4 mm Female	50			OCK	OAK		
SMPM Female	65	ZST	ZST			ZST	
1.85 mm Male	70	OCZ				OCZ	OBB
1.85 mm Female	70						OBA

1. Includes the most commonly used connectors. For more options, please contact a [Gore representative](#).

2. The maximum operating frequency of a test assembly is determined as the lowest frequency of either the connectors or the cable.

# Communication Test Systems

## Base Station, Antenna, RF Components/Modules

System Performance Requirements	Gore Cable Assembly Values
Measurement Accuracy	Precise, repeatable measurements from DC through 110 GHz
Stability Reproducibility/Repeatability	Excellent phase/amplitude stability over flexure and temperature
High Dynamic Range	<ul style="list-style-type: none"><li>• Low insertion loss</li><li>• Excellent VSWR</li></ul>
Handling/Operation	<ul style="list-style-type: none"><li>• Proven high flex life</li><li>• Low spring back</li><li>• Mechanical durability</li></ul>



# Communication Test Systems

## Base Station, Antenna, RF Components/Modules

We selected specific cable types of our test assemblies with connector options that meet the critical requirements of base stations, antennas, and RF components/modules (Tables 10 and 11). For more information, visit the product websites below or contact a [Gore representative](#).



- [GORE® PHASEFLEX® Microwave/RF Test Assemblies](#)
- [GORE® PHASEFLEX® Microwave/RF Test Assemblies, Type ON](#)
- [GORE® Microwave/RF Test Assemblies, General Purpose](#)

## Typical Applications

- P2P/backhaul
- Frequency coverage sub-6 GHz to mmWave 5G frequency band

**Table 10: Selected Gore Cable Types**

### Electrical Properties<sup>1</sup>

Gore Cable Type	GORE® PHASEFLEX® Microwave/RF Test Assemblies		GORE® Microwave/RF Test Assemblies, General Purpose
	OS	ON	G5
Maximum Frequency (GHz)	18	50	18
Typical VSWR	1.19:1	1.25:1	1.19:1
Typical Insertion Loss (dB)	1.36	3.67	1.13
Typical Phase Stability (Degree)	± 2.0	± 6.0	± 2.0
Typical Amplitude Stability (dB)	< ± 0.05	< ± 0.05	< ± 0.05

### Mechanical/Environmental Properties

Gore Cable Type	OS	ON	G5
Center Conductor	Stranded	Solid	Solid
Overall Diameter mm (in)	7.7 (0.305)	5.3 (0.210)	4.8 (0.190)
Nominal Weight g/m (g/ft)	147.6 (45)	68.9 (21)	52.5 (16)
Minimum Bend Radius mm (in)	25.4 (1.0)	25.4 (1.0)	25.4 (1.0)
Typical Flex Cycles	100,000	12,500	—
Temperature Range (°C)	-55 to 125	-55 to 125	-55 to 125
Crush Resistance kgf/cm (lbf/in)	44.6 (250)	33.5 (187)	—

1. Electrical specifications are based on a 0.9 m (36 in) assembly length and maximum frequency with straight connectors.

# Communication Test Systems

## Base Station, Antenna, RF Components/Modules

**Table 11: Connector Options<sup>1</sup>**

Connector Type	Maximum Frequency <sup>2</sup> (GHz)	GORE® PHASEFLEX® Microwave/RF Test Assemblies		GORE® Microwave/RF Test Assemblies, General Purpose
		OS	ON	G5
		18	50	18
SMA Male	18	R01	R01	R01
Type N Male	18	N01		N01
Type N Female	18	N02		
Precision N Male (Instrument Grade)	18	Q01	Q01	
2.92 mm Male	40		OCQ	
2.92 mm Female	40		OCP	
2.4 mm Male	50		OCJ	
2.4 mm Female	50		OCK	

1. Includes the most commonly used connectors. For more options, please contact a [Gore representative](#).

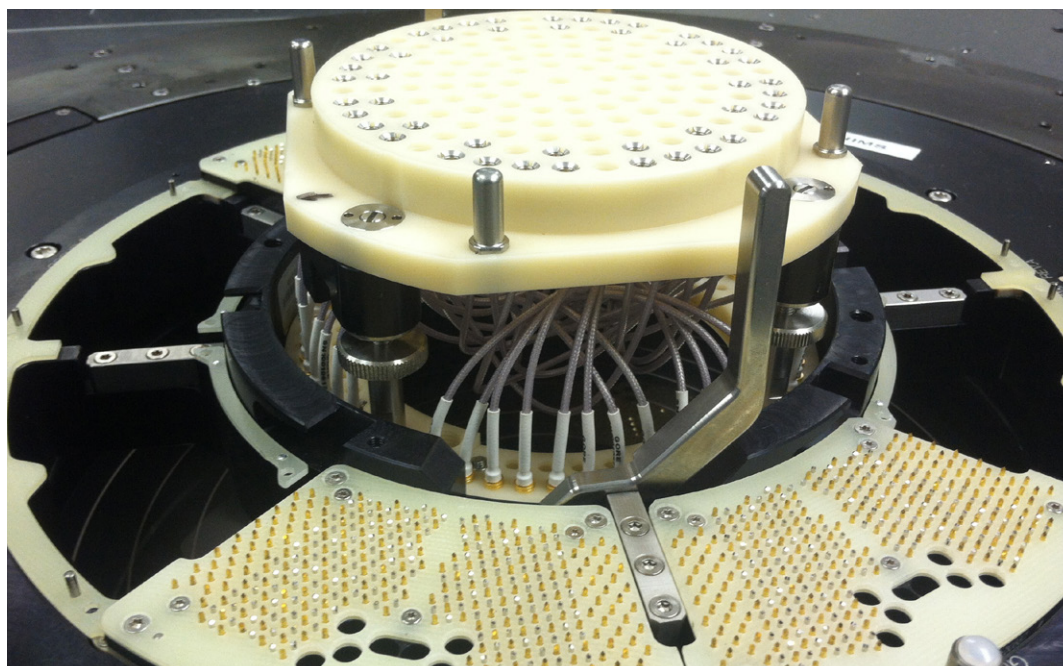
2. The maximum operating frequency of a test assembly is determined as the lowest frequency of either the connectors or the cable.



# Semiconductor Wafer Test Systems

## Load Board, Wafer Probe

System Performance Requirements	Gore Cable Assembly Values
Measurement Accuracy	<ul style="list-style-type: none"><li>• Precise, repeatable measurements from DC through 70 GHz</li><li>• Low insertion loss</li><li>• Excellent VSWR</li></ul>
Stability Reproducibility/Repeatability	Excellent phase/amplitude stability over flexure and temperature
High Density Handling/Operation	<ul style="list-style-type: none"><li>• High flexibility</li><li>• Lightweight with small diameters</li><li>• Easy routing</li><li>• Low spring back</li><li>• High-degree vertical integration of cables and connectors ensuring high stability of mechanical and electrical performance</li></ul>



**GORE® Microwave/RF Test Assemblies, General Purpose connected to load board.**

# Semiconductor Wafer Test Systems

## Load Board

We selected specific cable types of our test assemblies with connector options that meet the critical requirements of load boards (Tables 12 and 13). For more information, visit the product website below or contact a [Gore representative](#).

- [GORE® Microwave/RF Test Assemblies, General Purpose](#)

## Typical Applications

- Interconnections

**Table 12: Selected Gore Cable Types**

### Electrical Properties<sup>1</sup>

Gore Cable Type	GORE® Microwave/RF Test Assemblies, General Purpose		
	4L	53 / 54 / 55	89
Maximum Frequency (GHz)	18	18 / 40 / 70	40
Typical VSWR	1.33:1	1.32:1 / 1.33:1 / 1.40:1	1.40:1
Typical Insertion Loss (dB)	1.58	1.26 / 1.93 / 2.69	1.60
Typical Attenuation at Maximum Frequency dB/m (dB/ft)	5.04 (1.54)	3.69 (1.13) / 5.45 (1.66) / 7.34 (2.24)	4.46 (1.36)
Shielding Effectiveness (dB through 18 GHz)	> 100	> 100	> 100

### Mechanical/Environmental Properties

Gore Cable Type	4L	53 / 54 / 55	89
Center Conductor	Solid	Solid	Solid
Overall Diameter mm (in)	1.2 (0.047)	1.8 (0.070)	2.2 (0.085)
Nominal Weight g/m (g/ft)	6.6 (2)	13.1 (4)	16.4 (5)
Minimum Bend Radius mm (in)	6.4 (0.25)	10.2 (0.4)	12.7 (0.5)
Temperature Range (°C)	-55 to 125	-55 to 125	-55 to 125

1. Electrical specifications are based on a 0.3 m (12 in) assembly length and maximum frequency with straight connectors.

# Semiconductor Wafer Test Systems

## Load Board

Table 13: Connector Options<sup>1</sup>

GORE® Microwave/RF Test Assemblies, General Purpose						
Connector Type	Maximum Frequency <sup>2</sup> (GHz)	4L	53	54	89	55
		18	18	40	40	70
SMA Male	18	S01	S01	S01	S01	
SMA Female	18	S02	S02		S02	
SMP Bulkhead Full Detent Male	26.5				ZT4	
SMP Bulkhead Smooth Bore Male	26.5	ZKT	ZKT		ZKT	
SMP Bulkhead Ultra Smooth Bore Male	26.5	ZUJ	ZUJ		ZUJ	
SMP Float Mount Modified Full Detent Male	26.5		ZQF		ZQF	
SMP Female	26.5	ZEM	ZT8	ZT8	ZT8	
SMPM Full Detent Male	40			ZU2		
SMPM Smooth Bore Male	40		ZUK		ZUK	
SMPM Female	65	ZST	ZST	ZST	ZST	ZST
2.92 mm Male	40			OCX	OCQ	
2.92 mm Female	40	OC2	OC2	OC2		
2.4 mm Male	50			OCY		OCY
1.85 mm Male	70			OCZ		OCZ

1. Includes the most commonly used connectors. For more options, please contact a [Gore representative](#).

2. The maximum operating frequency of a test assembly is determined as the lowest frequency of either the connectors or the cable.

# Semiconductor Wafer Test Systems

## Wafer Probe

We selected specific cable types of our test assemblies with connector options that meet the critical requirements of wafer probes (Tables 14 and 15). For more information, visit the product website below or contact a [Gore representative](#).

- [GORE® Microwave/RF Test Assemblies, General Purpose](#)

## Typical Applications

- Interconnections: Small diameter, flexibility, and easy routing are critical
- Wafer probe: Stability over temperature is critical

**Table 14: Selected Gore Cable Types**

## Electrical Properties<sup>1</sup>

Gore Cable Type	GORE® Microwave/RF Test Assemblies, General Purpose		
	4Y	2Z	4F
Maximum Frequency (GHz)	40	50	70
Typical VSWR	1.30:1	1.26:1	1.30:1
Typical Insertion Loss (dB)	2.65	3.80	5.99
Typical Attenuation at Maximum Frequency dB/m (dB/ft)	2.57 (0.78)	4.13 (1.26)	6.13 (1.87)
Shielding Effectiveness (dB through 18 GHz)	> 100	> 100	> 100

## Mechanical/Environmental Properties

Gore Cable Type	4Y	2Z	4F
Center Conductor	Solid	Solid	Solid
Overall Diameter mm (in)	3.8 (0.150)	3.6 (0.140)	3.0 (0.120)
Nominal Weight g/m (g/ft)	36.1 (11)	29.5 (9)	29.5 (9)
Minimum Bend Radius mm (in)	25.4 (1.0)	25.4 (1.0)	12.7 (0.5)
Temperature Range (°C)	-55 to 125	-55 to 125	-55 to 125

1. Electrical specifications are based on a 0.9 m (36 in) assembly length and maximum frequency with straight connectors.



# Semiconductor Wafer Test Systems

## Wafer Probe

**Table 15: Connector Options<sup>1</sup>**

		GORE® Microwave/RF Test Assemblies, General Purpose		
Connector Type	Maximum Frequency <sup>2</sup> (GHz)	4Y	2Z	4F
		40	50	70
SMA Male	18	R01		
2.92 mm Male	40	OCQ		
2.92 mm Female	40	OCP	OBP	
2.4 mm Male	50	OCJ	OAJ	
2.4 mm Female	50	OCK	OAK	
1.85 mm Male	70			OBB
1.85 mm Female	70			OBA

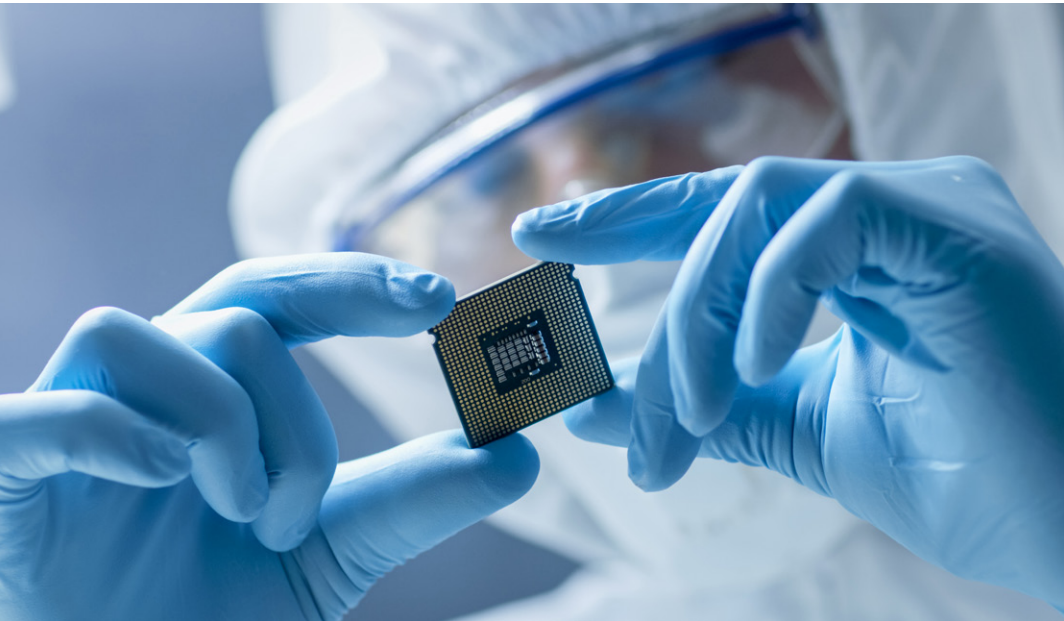
1. Includes the most commonly used connectors. For more options, please contact a [Gore representative](#).

2. The maximum operating frequency of a test assembly is determined as the lowest frequency of either the connectors or the cable.



# Semiconductor Package Test Systems

System Performance Requirements	Gore Cable Assembly Values
Measurement Accuracy	<ul style="list-style-type: none"><li>• Precise, repeatable measurements from DC through 70 GHz</li><li>• Low insertion loss</li><li>• Excellent VSWR</li></ul>
Stability Reproducibility/Repeatability	Excellent phase/amplitude stability over flexure and temperature
High Density Handling/Operation	<ul style="list-style-type: none"><li>• Smaller overall diameter</li><li>• High flexibility</li><li>• Low spring back</li><li>• Easy routing</li><li>• Mechanical durability</li></ul>



# Semiconductor Package Test Systems



We selected specific cable types of our test assemblies with connector options that meet the critical requirements of semiconductor package test systems (Tables 16 and 17). For more information, visit the product websites below or contact a [Gore representative](#).

- [GORE® PHASEFLEX® Microwave/RF Test Assemblies](#)
- [GORE® PHASEFLEX® Microwave/RF Test Assemblies, Type ON](#)

## Typical Applications

- Handling/operation: Frequent flex and movement

**Table 16: Selected Gore Cable Types**

### Electrical Properties<sup>1</sup>

Gore Cable Type	GORE® PHASEFLEX® Microwave/RF Test Assemblies		
	OH	ON	OF
Maximum Frequency (GHz)	18	50	70
Typical VSWR	1.19:1	1.25:1	1.30:1
Typical Insertion Loss (dB)	2.15	3.67	5.99
Typical Phase Stability <sup>2</sup> (Degree)	± 2.0	± 6.0	± 8.0
Typical Amplitude Stability <sup>2</sup> (dB)	< ± 0.05	< ± 0.05	< ± 0.05

### Mechanical/Environmental Properties

Gore Cable Type	OH	ON	OF
Center Conductor	Stranded	Solid	Solid
Overall Diameter mm (in)	5.3 (0.210)	5.3 (0.210)	5.8 (0.230)
Nominal Weight g/m (g/ft)	68.9 (21)	68.9 (21)	88.6 (27)
Minimum Bend Radius mm (in)	12.7 (0.5)	25.4 (1.0)	25.4 (1.0)
Typical Flex Cycles <sup>3</sup>	100,000	12,500	20,000
Temperature Range (°C)	-55 to 125	-55 to 125	-55 to 75
Crush Resistance kgf/cm (lbf/in)	33.5 (187)	33.5 (187)	44.6 (250)

1. Electrical specifications are based on a 0.91 m (36 in) assembly length and maximum frequency with straight connectors.

2. When cable is wrapped 360° around a 57 mm (2.25 in) radius mandrel.

3. When bent ± 90° at a radius that is twice the minimum bend radius, test assembly performs reliably through the stated flex cycles.

# Semiconductor Package Test Systems

**Table 17: Connector Options<sup>1</sup>**

		GORE® PHASEFLEX® Microwave/RF Test Assemblies		
Connector Type	Maximum Frequency <sup>2</sup> (GHz)	0H	0N	0F
		18	50	70
SMA Male	18	R01	R01	
SMA Female	18	R02	R02	
2.92 mm Male	40		0CQ	
2.92 mm Female	40		0CP	
2.4 mm Male	50		0CJ	
1.85 mm Male	70			0CB
1.85 mm Female	70			0CA

1. Includes the most commonly used connectors. For more options, please contact a [Gore representative](#).

2. The maximum operating frequency of a test assembly is determined as the lowest frequency of either the connectors or the cable.

# Semiconductor Package Test Systems

We selected specific cable types of our test assemblies with connector options that meet the critical requirements of semiconductor package test systems (Tables 18 and 19). For more information, visit the product website below or contact a [Gore representative](#).

- [GORE® Microwave/RF Test Assemblies, General Purpose](#)

## Typical Applications

- Board-to-board
- Inside-the-box
- Interconnections

**Table 18: Selected Gore Cable Types**

## Electrical Properties<sup>1</sup>

**GORE® Microwave/RF Test Assemblies, General Purpose**

Gore Cable Type	4L	89	53 / 54 / 55
Maximum Frequency (GHz)	18	40	18 / 40 / 70
Typical VSWR	1.33:1	1.40:1	1.32:1 / 1.33:1 / 1.40:1
Typical Insertion Loss (dB)	1.58	1.60	1.26 / 1.93 / 2.69

## Mechanical/Environmental Properties

Gore Cable Type	4L	89	53 / 54 / 55
Center Conductor	Solid	Solid	Solid
Overall Diameter mm (in)	1.2 (0.047)	2.2 (0.085)	1.8 (0.070)
Nominal Weight g/m (g/ft)	6.6 (2)	16.4 (5)	13.1 (4)
Minimum Bend Radius mm (in)	6.4 (0.25)	12.7 (0.5)	10.2 (0.4)
Temperature Range (°C)	-55 to 125	-55 to 125	-55 to 125

1. Electrical specifications are based on a 0.3 m (12 in) assembly length and maximum frequency with straight connectors.



# Semiconductor Package Test Systems

**Table 19: Connector Options<sup>1</sup>**

		GORE® Microwave/RF Test Assemblies, General Purpose				
Connector Type	Maximum Frequency <sup>2</sup> (GHz)	4L	53	54	89	55
		18	18	40	40	70
SMA Male	18	S01	S01	S01	S01	
SMA Female	18	S02	S02		S02	
SMP Bulkhead Full Detent Male	26.5				ZT4	
SMP Bulkhead Smooth Bore Male	26.5	ZKT	ZKT		ZKT	
SMP Bulkhead Ultra Smooth Bore Male	26.5	ZUJ	ZUJ		ZUJ	
SMP Float Mount Modified Full Detent Male	26.5		ZQF		ZQF	
SMP Female	26.5	ZEM	ZT8	ZT8	ZT8	
SMP Box Right-Angle Female	26.5	ZF6	ZF6		ZF6	
SMPM Full Detent Male	40			ZU2		
SMPM Smooth Bore Male	40		ZUK		ZUK	
SMPM Female	65	ZST	ZST	ZST	ZST	ZST
SMPM Box Right-Angle Female	65	ZVY	ZVY	ZVY	ZVY	ZVY
SMPM Bulkhead Female	40	ZW7	ZW7		ZW7	
2.92 mm Male	40			OCX	OCQ	
2.92 mm Female	40	OC2	OC2	OC2		
2.4 mm Male	50			OCY		OCY
1.85 mm Male	70			OCZ		OCZ

1. Includes the most commonly used connectors. For more options, please contact a [Gore representative](#).

2. The maximum operating frequency of a test assembly is determined as the lowest frequency of either the connectors or the cable.



Information in this publication corresponds to W. L. Gore & Associates' current knowledge on the subject. It is offered solely to provide possible suggestions for user experimentations. It is NOT intended, however, to substitute for any testing the user may need to conduct to determine the suitability of the product for the user's particular purposes. Due to the unlimited variety of potential applications for the product, the user must BEFORE production use, determine that the product is suitable for the intended application and is compatible with other component materials. The user is solely responsible for determining the proper amount and placement of the product. Information in this publication may be subject to revision as new knowledge and experience become available. W. L. Gore & Associates cannot anticipate all variations in actual end user conditions, and therefore, makes no warranties and assumes no liability in connection with any use of this information. No information in this publication is to be considered as a license to operate under or a recommendation to infringe any patent right.

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

GORE, *Together, improving life*, PHASEFLEX, the purple cable and designs are trademarks of W. L. Gore & Associates, Inc. ©2021 W. L. Gore & Associates, Inc.

---

