

The Right Parts, Right Away



PRODUCT GUIDE

Test & Measurement Components

Testing and Calibration Made Easy with a Complete Range of Components

Fairview Microwave offers a broad portfolio of in-stock and ready-to-ship test and measurement components. Our range of test and measurement products includes everything from high-end VNA test cables, engineering-grade calibration kits, tools, and other testing and calibration products. Our test and measurement options can be used in both 50 Ohm and 75 Ohm systems and includes test cables that perform up to 110 GHz.

All T&M components can be viewed online at www.fairviewmicrowave.com, with real-time pricing, inventory, and comprehensive datasheets that include typical performance graphs and detailed CAD drawings. Live technical support representatives are available to answer any of your technical questions and can assist with selecting the right product to meet your specifications.

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Calibration Kits and Components

Bench Type Calibration Kits

FM P/N	Connector Series	Impedance (Ohms)	Freequency Range (GHz)	Cal Type
FMCK1015	2.4mm	50	DC to 50	SOL
FMCK1016	2.4mm	50	DC to 50	SOLT
FMCK1017	2.92mm	50	DC to 40	SOL
FMCK1018	2.92mm	50	DC to 40	SOLT
FMCK1019 3.5mm		50	DC to 26.5	SOL
FMCK1020	3.5mm	50	DC to 26.5	SOLT
FMCK1021	7/16 DIN	50	DC to 7.5	SOL
FMCK1022	7/16 DIN	50	DC to 7.5	SOLT
FMCK1023	7mm	50	DC to 18	SOL
FMCK1024	BNC	50	DC to 10	SOL
FMCK1025	N	50	DC to 18	SOL
FMCK1026	N	50	DC to 18	SOL





4-in-1 Calibration Kits

- · Lightweight portable 4-in-1 package
- · Precision 3.5mm connectors
- Gold plated Short Open Load Thru
- Supports 26.5 GHz SOLT calibration
- · Calibration coefficients on datasheet



Fairview Microwave's portable calibration kits consist of two models, both with a compact, lightweight, 4-in-1 design package. These short-open-load-through (SOLT) calibration kits have a 26.5 GHz calibration capability and feature precision 3.5mm connectors, a gold plated short-open-load-thru, and a handy lanyard.

These SOLT calibration kits have an impedance level of 50 Ohms nominal. They also have a phase deviation of +/-2 degrees maximum and return loss of 30 dB minimum. They are ideal for telecommunications, military electronics, automotive, medical, aerospace and consumer electronics applications.

These SOLT calibration kits are available off-the-shelf and can be shipped immediately.

FM P/N	Connector 1	Impedance (Ohms)	Frequency Range (GHz)	Weight (lbs)
FMCK1012	3.5mm Female Short Open Load Thru	50	DC to 26.5	2.752
FMCK1013	3.5mm Male Short Open Load Thru	50	DC to 26.5	2.752

Coaxial RF Probes & Probe Positioning Hardware

PCB RF Probe Positioner (FMTL1000)

- · RF PCB probe positioner holds coaxial probes
- · Magnetic mounting plate
- · On-off positioner switch
- · Articulated joints
- · Multi-axis positioner control

Coaxial RF Microwave GS and GSG Probe Series (FMPB1000-FMPB1007)

- · Max. operating frequency of 20 GHz
- · RF probe return loss better than 10 dB
- · GS and GSG probes feature gold plated contacts
- · Compliant coaxial GSG (or GS) pogo pins



Fairview Microwave's coaxial RF probes and positioner are perfect for use with signal integrity measurements. Other RF microwave coaxial GSG and GS probe applications are coplanar waveguide, chip evaluations, substrate characterization, test fixtures and gigabit SERDES applications.

Our RF coaxial GSG and GS probe series provides return loss better than 10 dB and a maximum operating frequency of 40 GHz. Fairview Microwave coaxial RF microwave GS and GSG probe components feature 2.92mm and 3.5mm female interfaces, a pitch of 800 or 1500 microns, and capability for cable mounting. Additional features include gold-plated contacts and compliant coaxial GSG (or GS) pogo pins that allow for a broad range of probing angles. These coax printed circuit board RF probes can be used by hand, with or without a probe positioner.

The PCB probe positioner can hold coaxial GS / GSG probes, has articulated joints, and delivers multi-axis positioner control. This PCB RF probe positioner also features a magnetic mounting plate with an on-off positioner switch.

As with our other over 40,000 RF, microwave and mmWave components, this GS and GSG RF microwave coaxial PCB probe series and positioner are in-stock. They also ship the same day they are purchased. Fairview Microwave is an excellent source for coaxial-cable-based GSG and GS PCB probe and positioner components.

FM P/N	Probe Tip Config	Number of Ground)	Pitch 1 (µm)	Pitch 2 (µm)	Connector 1	Impedance (Ohms)	Frequency Max. (GHz)	Return Loss Max (dB)	Insertion Loss Max. (dB)
FMPB1006	GS	1	800		2.92mm Female	50	40	10	0.5
FMPB1002	GS	1	800		3.5mm Female	50	20	10	0.5
FMPB1007	GS	2	1500	2,500	2.92mm Female	50	40	10	0.5
FMPB1003	GS	2	1500	2,500	3.5mm Female	50	20	10	0.5
FMPB1004	GSG	2	800		2.92mm Female	50	40	10	0.5
FMPB1000	GSG	2	800		3.5mm Female	50	20	10	0.5
FMPB1005	GSG	4	1500	2,500	2.92mm Female	50	40	10	0.5
FMPB1001	GSG	4	1500	2,500	3.5mm Female	50	20	10	0.5



Test Cable Assemblies

40 GHz and 67 GHz Skew Matched Cables

- · Delay match as low as 1 ps
- · Excellent VSWR of 1.4:1
- 100% tested up to 67 GHz
- · Extremely flexible
- · Polarity indicators on cable ends



Fairview Microwave's skew matched cables consist of seven models that are extremely flexible and have delay match as low as 1 ps. These cables deliver excellent VSWR of 1.4:1 and are 100% tested for skew match. They also include polarity indicators and restraint bands to keep them paired up.

These delay matched cables have a frequency range of DC to 67 GHz, covering two channels with 50 Ohms nominal impedance. They are made of micro porous PTFE cable dielectric and feature double- or triple-shielded outer conductors, 1.85mm or 2.92mm male connectors, and finger-grip coupling nuts.

Skew matched cables are ideal for networking, semiconductor test and supercomputing industries where skew match is important.

Fairview Microwave's skew matched cable pairs are in-stock and ready for immediate shipment with no minimum order quantity.

FM P/N	Connector 1	Connector 2	Frequency Max (GHz)	VSWR Max	Insertion Loss Typ. (dB/ft)
FMCA2517-12	2.92mm Male	2.92mm Male	40	1.3:1	-1
FMCA2517-24	2.92mm Male	2.92mm Male	40	1.3:1	-1.8
FMCA2517-36	2.92mm Male	2.92mm Male	40	1.3:1	-2.5
FMCA2517-48	2.92mm Male	2.92mm Male	40	1.3:1	-3.3
FMCA1735-12	1.85mm Male	1.85mm Male	67	1.4:1	3.2
FMCA1735-24	1.85mm Male	1.85mm Male	67	1.4:1	5
FMCA1735-36	1.85mm Male	1.85mm Male	67	1.4:1	6.7
FMCA1735-48	1.85mm Male	1.85mm Male	67	1.4:1	8.2

Ruggedized Test Cable Assemblies

26.5 GHz and 40 GHz Test Cables

- · Rugged VNA test port extenders
- · Torsion resistant connector heads
- Max. phase variation +/- 2° with flexure to 18 GHz
- Max. phase variation +/- 3° with flexure to 26.5 GHz
- Max. phase variation +/- 5° with flexure to 40 GHz
- 5,000 mating cycles minimum
- 75,000 flexure cycles minimum
- · Each cable is serialized and comes with RF test data
- SMA, Type-N, 2.92mm and 2.4mm configurations available



High performance precision VNA test cables designed to provide highly accurate repeatable test results.

Fairview Microwave's ruggedized VNA test cables are designed to provide customers with repeatable accurate VNA measurements. These test cables have excellent electrical properties including low insertion loss, low VSWR and phase stability of +/- 2° to 18 GHz with flexure. Torsion resistant connector heads are directly attached to stainless steel conduit style armoring, providing a rugged design for up to 5,000 mating cycles with proper care. The cable armoring enhances amplitude and phase stability by preventing stress due to over bending while maintaining the flexibility required for testing in a lab environment. When used with the appropriate calibration kits, these test cables effectively extend the test port of the VNA, allowing accurate measurement of devices that cannot be directly connected to a Network Analyzer test port.

FM P/N	Connector 1	Connector 2	Frequency Max (GHz)	Impedance	VSWR	Insertion Loss	Length
				(Ohms)		@fmax (dB/ft)	(in)
FM26VNA005	2.92mm Male	2.92mm Male	26.5	50	1.25	0.64	Various
FM40VNA001	2.92mm Male	2.92mm Male	40	50	1.38	0.83	Various
FM40VNA004	2.4mm Male	2.4mm Male	40	50	1.38	0.83	Various
FM40VNA005	2.4mm Female	2.4mm Female	40	50	1.38	0.83	Various

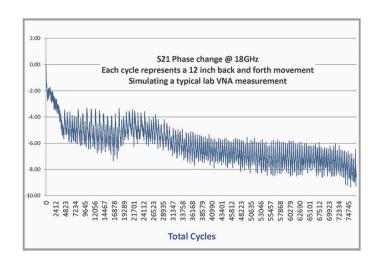
The Need for Amplitude and Phase Stable VNA Cables

Amplitude and phase variation post Vector Network Analyzer (VNA) calibration can cause inaccurate S-Parameter measurements. As a result, amplitude and phase stable cables should be used to make accurate VNA measurements. During normal use, a set of VNA test cables acting as test port extenders are part of the calibration procedure, and the test equipment's reference plane is moved to the connectors of the VNA test cables. After calibration, the cables will be moved into position and connected to the Device Under Test (DUT). It is during this movement that phase variations can occur, affecting the algorithm used by the VNA to accurately measure a DUT connected to the calibrated reference plane at the end of the test cables. For this reason, a quality phase stable test cable is essential to make repeatable, accurate VNA measurements. Without high-quality cables, it is also likely that errors in insertion loss will be seen as a result of amplitude changes during flexure, which can greatly affect precise VNA measurements.



The Need for Amplitude and Phase Stable VNA Cables Continued

Fairview Microwave's ruggedized VNA test cables have a maximum phase change of +/- 2 degrees at 18 GHz with typical calibration procedures. The measurements to the right show the phase change at 18 GHz as a result of continuously flexing the cable back and forth 12 inches, simulating connecting and disconnecting movements typical in lab testing, where the VNA test cable needs to be moved to connect a DUT. In this accelerated life cycle test, the phase variation window staved consistent beyond 75,000 movement cycles. A typical VNA test setup will be re-calibrated often, daily in most cases, and will mitigate the absolute phase change over the life of the cable. For this reason, Fairview Microwave's new amplitude and phase stable ruggedized VNA test cables will provide the reliable and repeatable, accurate test results users require. It is also important to note that new cables may require some minor usage before settling into their ideal state, but with re-calibration they will remain stable.



50 and 67 GHz Test Cable Assemblies

- · Highly flexible VNA test cables up to 50 and 67 GHz
- Max. phase variation +/- 6° to 50 GHz and +/- 8° to 67 GHz with flexure
- VSWR of 1.3:1 to 50 GHz and 1.4:1 to 67 GHz
- · Rated up to 5,000 mating cycles
- Up to 100,000 flex cycles
- · Swept right angle connector options available
- · Highly flexible stainless steel braided armoring
- Designed for accurate and repeatable measurements





FM P/N	Connector 1	Connector 2	Frequency Max (GHz)	Impedance (Ohms)	VSWR	Insertion Loss (dB/ft @ fmax)	Insertion Loss (dB/m @ fmax)	Phase Stability with Flexure (Degrees)	Flex Cycles	Jacket Material	Jacket Diameter (in)
FMC500-24	2.4mm Male	2.4mm Male	50	50	1.300	3.7	12.14	6.00	100,000	Nomex	0.270
FMC500-48	2.4mm Male	2.4mm Male	50	50	1.300	7	22.96	6.00	100,000	Nomex	0.270
FMC600-24	2.4mm Male	2.4mm Female	50	50	1.300	3.7	12.14	6.00	100,000	Nomex	0.270
FMC600-48	2 4mm Male	2 4mm Female	50	50	1 300	7	22 96	6.00	100.000	Nomex	0.270

50 and 67 GHz Test Cable Assemblies Continued

FM P/N	Connector 1	Connector 2		Impedance (Ohms)	VSWR	Insertion Loss (dB/ft @ fmax)	Insertion Loss (dB/m @ fmax)	Phase Stability with Flexure (Degrees)	Flex Cycles	Jacket Material	Jacket Diameter (in)
FMC800	1.85mm Male	1.85mm Male	67	50	1.400	,	6.4	8.00	100,000	Nomex	0.270
FMC800-24	1.85mm Male	1.85mm Male	67	50	1.400	4.3	14.1	8.00	100,000	Nomex	0.270
FMC800-48	1.85mm Male	1.85mm Male	67	50	1.400	8.2	26.9	8.00	100,000	Nomex	0.270
FMC900	1.85mm Male	1.85mm Female	67	50	1.400	1.95	6.4	8.00	100,000	Nomex	0.270
FMC900-24	1.85mm Male	1.85mm Female	67	50	1.400	4.3	14.1	8.00	100,000	Nomex	0.270
FMC900-48	1.85mm Male	1.85mm Female	67	50	1.400	8.2	26.9	8.00	100,000	Nomex	0.270
FMC1000-48	1.85mm Male	1.85mm Male RA	67	50	1.400	8.2	26.9	8.00	100,000	Nomex	0.270

110 GHz 1.0mm Flexible VNA Precision Cables

- · Operating to 110 GHz
- · Lightweight, protective armoring
- · Precision 1.0mm stainless steel connectors
- · Excellent amplitude and phase stability with flexure
- · Non-conductive protective Nomex® outer sleeve
- · Each serialized assembly includes test data





Fairview Microwave's high-performance, flexible VNA test cables operate at up to 110 GHz and deliver precise results for testing using a coaxial cable and 1.0 mm stainless steel connector interface. The coaxial cable is covered by a non-conductive Nomex® outer sleeve. In addition to Nomex, a light-duty armoring protects the cable, while maintaining a 0.27-inch diameter and improving stability during flexure. These cables feature 50 Ohm impedance, a maximum VSWR of 1.5:1 and excellent phase/amplitude stability under flexure.

Our flexible 1.0 mm VNA test cables operate over a wide range of temperatures from -65°C to +125°C. They are RoHS and REACH compliant. Each cable assembly is fully tested and comes with serialized test data. These cables are available in standard 6-inch and 12-inch lengths with male-to-male or male-to-female configurations. These VNA test cables are designed to deliver precision testing results for Vector Network Analyzer (VNA) testing, semiconductor probe testing, automotive radar testing and military radar testing.

Nomex® is a registered trademarks of E. I. du Pont de Nemours and Company.

FM P/N	Connector 1	Connector 2	•	Frequency Max (GHz)	F	-		Outer Diameter
			(in)		(Ohms)		Max (dB)	(in)
FMTC700-6	1.0mm Male	1.0mm Male	6.0	110	50	1.5	3.12	0.27
FMTC700-12	1.0mm Male	1.0mm Male	12.0	110	50	1.5	5.62	0.27
FMTC701-6	1.0mm Male	1.0mm Female	6.0	110	50	1.5	3.12	0.27
FMTC701-12	1.0mm Male	1.0mm Female	12.0	110	50	1.5	5.62	0.27



Handheld RF Analyzer Rugged Phase Stable Cable Assemblies

- · Designed for in-field measurements with handheld or portable analyzers
- · Excellent VSWR as low as 1.2:1
- Excellent phase stability with flexure as low as 1.5 degrees
- · Rugged armor provides 1200 p.s.i crush resistance plus torque resistance
- · UV resistance jacket
- · Each assembly is serialized and includes test data





Fairview Microwave's line of test cables for handheld RF analyzers consists of 19 models designed to deliver optimal amplitude and phase stability with flexure. The portable radio frequency analyzer cable series boasts VSWR as low as 1.2:1 and maximum operating frequency of 27 GHz, depending on the configuration. These rugged RF handheld portable analyzer test cables feature crush resistance of 1200 psi and operating temperature range of -55°C to +105°C.

Our portable analyzer test cables are made with silver-plated copper cable conductors, stainless steel-body connectors, a UV-resistant jacket, and a rugged, multi-layer armor for crush and torque resistance. These testing cables for handheld RF analyzers are offered with 7/16, N, SMA, TNC or 3.5mm connector options. Each analyzer cable is serialized and includes test data.

The Fairview Microwave handheld portable radio frequency analyzer cable series can be used as direct replacements for popular RF testing equipment. Compatible RF analyzer test equipment includes: FieldFox®, Site Master, CellAdvisor® and Sitehawk® handheld portable RF analyzers.

Typical applications for these rugged portable analyzer cables include field testing, tower measurements, base station analyzers, handheld network analyzers, portable spectrum analyzers, distance-to-fault measurements and site maintenance. As with the other over 40,000 RF, microwave and mmWave Fairview Microwave products, this portable handheld radio frequency analyzer cable assembly series is in-stock. Not only are these compatible cables in-stock, they also ship the same day they are purchased.

FM P/N	Connector 1	Connector 2	Frequency Max (GHz)	Impedance (Ohms)	VSWR	Insertion Loss @fmax (dB/ft)	Phase Stability with Flexure (Degrees)	Length (in)
FMCA1400-60	N Male	7/16 DIN Male	7	50	1.2:1	2.16	1.5	60.0
FMCA1400-144	N Male	7/16 DIN Male	7	50	1.2:1	4.92	1.5	144.0
FMCA1401-60	N Male	7/16 DIN Female	7	50	1.2:1	2.16	1.5	60.0
FMCA1401-144	N Male	7/16 DIN Female	7	50	1.2:1	4.92	1.5	144.0
FMCA1402-60	N Male	N Male	9	50	1.2:1	2.52	1.5	60.0
FMCA1402-144	N Male	N Male	9	50	1.2:1	5.74	1.5	144.0
FMCA1403-60	N Male	N Male Right Angle	9	50	1.2:1	2.52	1.5	60.0
FMCA1403-144	N Male	N Male Right Angle	9	50	1.2:1	5.74	1.5	144.0
FMCA1404-60	N Male	N Female	9	50	1.2:1	2.52	1.5	60.0
FMCA1404-144	N Male	N Female	9	50	1.2:1	5.74	1.5	144.0
FMCA1405-100CM	N Male	N Male	18	50	1.3:1	2.66	2.0	39.4
FMCA1406-100CM	N Male	N Male Right Angle	18	50	1.3:1	2.66	2.0	39.4
FMCA1407-100CM	N Male	N Female	18	50	1.3:1	2.66	2.0	39.4
FMCA1408-60	N Male	SMA Male	18	50	1.3:1	3.89	2.0	60.0
FMCA1409-60	N Male	SMA Female	18	50	1.3:1	3.89	2.0	60.0
FMCA1410-60	N Male	TNC Male	18	50	1.3:1	3.89	2.0	60.0
FMCA1411-60	N Male	TNC Female	18	50	1.3:1	3.89	2.0	60.0
FMCA1412-100CM	3.5mm Male	3.5mm Female	27	50	1.3:1	3.46	4.0	39.4
FMCA1413-100CM	3.5mm Female	3.5mm Female	27	50	1.3:1	3.46	4.0	39.4

Phase Stable Test Cable Assemblies-50 Ohm

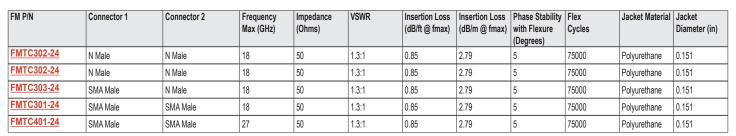
FM-195TC Series Phase Stable Test Cable Assemblies

- · Phase and amplitude stability with flexure
- Small diameter, lighter weight and lower profile for high density test applications
- Phase change with flexure +/-2° to 18 GHz
- · Excellent for multi-port test equipment
- · Very flexible and durable cable with a min. bend radius of 1 inch
- · Excellent VSWR and insertion loss
- Extra strain relief for extended connector body with booting to enhance stability and longevity
- · Each serialized assembly comes with matching test data
- · 5,000 mating cycles when properly mated
- · In-stock and ready to ship

FM P/N	Connector 1	Connector 2		Impedance (Ohms)			Insertion Loss (dB/m @ fmax)	Phase Stability with Flexure (Degrees)	Flex Cycles	Jacket Material	Jacket Diameter (in)
FMTC103-24	N Male	N Male	18	50	1.25:1	0.68	2.23	2	75000	FEP	0.195

FM-151TC Series Phase Stable Test Cable Assemblies

- · Phase and amplitude stability with flexure
- Small diameter, lighter weight and lower profile for high density test applications
- Phase change with flexure +/-5° to 18 GHz
- · Excellent for multi-port test equipment
- Very flexible and durable cable with a min. bend radius of 0.75"
- · Excellent VSWR and insertion loss
- Extra strain relief for extended connector body with booting to enhance stability and longevity
- · Each serialized assembly comes with matching test data
- · 5,000 mating cycles when properly mated
- · In-stock and ready to ship







Semi-Rigid Pigtail Test Probes

- Operating to 6 GHz and 18 GHz
- SMA Female connectors
- Excellent VSWR of 1.35:1 and 1.4:1
- Straight-cut and pre-stripped probe ends available



FM P/N	Connector 1	Cable	Lead	Frequency Max (GHz)	Impedance (Ohms)	VSWR	Insertion Loss @fmax (dB/ft)	Length (in)
FMCA2387-3	SMA Female 2 Hole Flange	PE-SR047FL	Straight Cut Lead	18	50	1.4:1		3.0
FMCA2385-3	SMA Female	PE-SR047FL	Straight Cut Lead	18	50	1.4:1		3.0
FMCA2397-3	SMA Female 4 Hole Flange	PE-SR405FL	Straight Cut Lead	18	50	1.5:1		3.0
FMCA2534-3	SMA Female	PE-SR047FL	Trimmed Lead	18	50	1.4:1		3.0
FMCA2386-3	SMA Female 2 Hole Flange	PE-SR047FL	Trimmed Lead	18	50	1.4:1		3.0
FMCA2388-3	SMA Female 4 Hole Flange	PE-SR047FL	Trimmed Lead	18	50	1.4:1		3.0
FMCA2389-3	SMA Female 4 Hole Flange	PE-SR047FL	Straight Cut Lead	18	50	1.4:1		3.0
FMCA2390-3	SMA Male	PE-SR047FL	Trimmed Lead	20	50	1.4:1		3.0
FMCA2391-3	SMA Male	PE-SR047FL	Straight Cut Lead	20	50	1.4:1		3.0
FMCA2392-3	SMA Female	PE-SR405FL	Trimmed Lead	18	50	1.4:1		3.0
FMCA2393-3	SMA Female	PE-SR405FL	Straight Cut Lead	18	50	1.4:1		3.0
FMCA2394-3	SMA Female 2 Hole Flange	PE-SR405FL	Trimmed Lead	18	50	1.4:1		3.0
FMCA2395-3	SMA Female 2 Hole Flange	PE-SR405FL	Straight Cut Lead	18	50	1.4:1		3.0
FMCA2396-3	SMA Female 4 Hole Flange	PE-SR405FL	Trimmed Lead	18	50	1.5:1		3.0
FMCA2398-3	SMA Male	PE-SR405FL	Trimmed Lead	18	50	1.4:1		3.0
FMCA2400-3	SMA Female	PE-SR405FLJ	Trimmed Lead	18	50	1.4:1		3.0
FMCA2401-3	SMA Female	PE-SR405FLJ	Straight Cut Lead	18	50	1.4:1		3.0
FMCA2399-3	SMA Male	PE-SR405FL	Straight Cut Lead	18	50	1.4:1		3.0

Tools

Torque Wrenches



FM P/N	Туре	Bit Hex Size	Preset Torque (inlbs)	Design
ST-1MM-1564-BO4	1.0mm	15/64 inch	4	Break-Over
ST-1mm1	1.0mm	6 inch	4	Click
ST-H6mm	1.0mm	6 inch		Click
ST-MW1	1.85mm, 2.4mm	5/16 inch	9	Click
ST-H516	1.85mm, 2.4mm	5/16 inch		Click
	3.5mm, 2.92mm	5/16 inch	8	Break-Over
ST-SMA-516-BO8A	3.5mm, 2.92mm	5/16 inch	8	Break-Over
ST-SMA-516-BO12	3.5mm, 2.92mm	5/16 inch	12	Break-Over
ST-4195	4.1/9.5 Mini DIN	22 inch	90	Click
ST-H22mm	4.1/9.5 Mini DIN	22 inch		Click
ST-N9	4.3-10	5/8 inch	44.3	Break-Over
ST-D3	7/16 DIN	1 3/8 inch	221	Click
ST-H138	7/16 DIN	1 3/8 inch		Click
ST-D-27MM-B20	7/16 DIN	27 inch	20	Break-Over
ST-D2	7/16 DIN	27 inch	221	Click
ST-H27mm	7/16 DIN	27 inch		Click
ST-D1	7/16 DIN	32 inch	221	Click
ST-H32mm	7/16 DIN	32 inch		Click
<u>ST-N11</u>	7/16 Hex	7/16 inch	26.5	Break-Over
<u>ST-N10</u>	7/8 Hex	7/8 inch	44.3	Break-Over
ST-7mm	7mm	3/4 inch	12	Click
ST-HN1	HN	7/8 inch	16	Click
ST-H1316	N	13/16 inch		Click
ST-N3	N	18 inch	13	Click
ST-H18mm	N	18 inch		Click
ST-N4	N	19 inch	13	Click
ST-H19mm	N	19 inch		Click
ST-N-2532-BO8	N	20 inch	8	Break-Over
<u>ST-N5</u>	N	20 inch	8.85	Click



Torque Wrenches Continued

FM P/N	Туре	Bit Hex Size	Preset Torque (inlbs)	Design
ST-N8	N	20 inch	13	Click
ST-N-2532-BO14	N	25/32 inch	14	Break-Over
ST-N-34-BO8	N	3/4 inch	8	Break-Over
ST-N2	N	3/4 inch	13	Click
ST-N-34-BO14	N, 7mm	3/4 inch	14	Break-Over
ST-N-1316-BO8	N, SC	13/16 inch	8	Break-Over
ST-N-1316-BO14	N, SC	13/16 inch	14	Break-Over
ST-N1	N, SC	13/16 inch	14	Click
74Z-0-0-79	SMA	5/16 inch	4	Click
ST-SMA-516-BO5A	SMA	5/16 inch	5	Break-Over
ST-SMA-516-BO5	SMA	5/16 inch	5	Break-Over
ST-SMA5	SMA	5/16 inch	5	Click
ST-SMA9	SMA	5/16 inch	5	Screwdriver
ST-SMA2	SMA	5/16 inch	6	Click
ST-SMA1	SMA	5/16 inch	7.5	Click
ST-SMA3	SMA	5/16 inch	8	Click
ST-SMA8	SMA	5/16 inch	8	Screwdriver
74Z-0-0-21	SMA	5/16 inch	8.85	Click
ST-SMC1	SMC	1/4 inch	3	Click
ST-SMC-1564-BO3	SMC	15/64 inch	3	Break-Over
ST-H732	SMC	7/32 inch		Click
ST-SSMA-14-BO5	SSMA	1/4 inch	5	Break-Over
ST-SSMA1	SSMA	1/4 inch	5	Click
ST-SSMA-14-BO8	SSMA	1/4 inch	8	Break-Over
ST-SSMA2	SSMA	1/4 inch	8	Click
<u>ST-H14</u>	SSMA, SMC	1/4 inch		Click
ST-SSMC-532-BO2	SSMC	5/32 inch	2	Break-Over
ST-SSMC1	SSMC	5/32 inch	2	Click
ST-SSMC	SSMC	5/32 inch	2	Click
ST-SSMC2	SSMC	5/32 inch	2	Screwdriver
ST-H532	SSMC	5/32 inch		Click
ST-TNC-58-BO6	TNC	5/8 inch	6	Break-Over
ST-TNC-58-BO12	TNC	5/8 inch	12	Break-Over
ST-TNC2	TNC	5/8 inch	13	Click
ST-H58	TNC	5/8 inch		Click
ST-TNC-916-B06	TNC	9/16 inch	6	Break-Over
ST-TNC-916-BO12	TNC	9/16 inch	12	Break-Over
ST-TNC1	TNC	9/16 inch	13	Click

Filters

Tunable Filters

FM P/N	Design	Frequency Band (GHz)	Bandwidth (%)	No. of Sections	Connector Type	ECCN
SBPF-0125-0250- 05-N	Band Pass	125 MHz - 250 MHz	5	5	N	EAR99
SBPF-1000-2000- 05-N	Band Pass	1-2	5	5	N	EAR99
SBRF-0250-0500- 01-N	Band Reject	250 MHz - 500 MHz	1	3	N	EAR99

Attenuators

Programmable Attenuators, Bench Top and USB

FM P/N	Туре	Frequency Range (GHz)	Attenuation Range (dB)	Insertion Loss (dB)	Step Resolution (dB)	Switching Speed (µs)	Power Rating (Watts)	Connector	Mechanical Dimensions L(in) x W(in) x H(in)
FMAT5012	TTL Controlled	5 MHz - 2.15	0 - 63	5.25	1	5,000	30	F	
FMAT5006	TTL Controlled	30 MHz - 3	0 - 63	4	1	1,000	0	SMA	
FMAT5005	TTL Controlled	30 MHz - 3	0 - 63.5	4	0.5	1,000	0	SMA	
FMAT5007	TTL Controlled	30 MHz - 3	0 - 95	6	1	1,000	0	SMA	
SDA-060-060- 0025-SMA	TTL Controlled	30 MHz - 6	0 - 60	4	0.25	50,000	0.1	SMA	2 x 1.8 x 0.5
FMAT5001	TTL Controlled	100 MHz - 18	0 - 30	5	1	1	0.25	2.92mm	2 x 1.8 x 0.5
SDA-400-030- 0100-K	TTL Controlled	100 MHz - 40	0 - 30	8	1	1	0.25	2.92mm	2 x 1.8 x 0.5



Programmable Attenuators, Bench Top and USB Continued

FM P/N	Туре	Frequency Range (GHz)	Attenuation Range (dB)	Insertion Loss (dB)	Step Resolution (dB)	Switching Speed (µs)	Power Rating (Watts)	Connector	Mechanical Dimensions L(in) x W(in) x H(in)
FMAT5009	TTL Controlled	200 MHz - 6	0 - 63	5.5	1	1,000	0	SMA	
FMAT5010	TTL Controlled	200 MHz - 6	0 - 95	8	1	1,000	0	SMA	
FMAT5011	TTL Controlled	450 MHz - 2.15	0 - 127	4.5	1	2,000	0	F	
SDA-180-060- 0006-SMA	TTL Controlled	500 MHz - 18	0 - 60	4.5	0.06	1	1	SMA	2 x 1.8 x 0.5
FMAT5008	TTL Controlled	700 MHz - 3	0 - 127	6	1	5,000	0	SMA	
FMAT6001	TTL Controlled	18 - 40	0 - 30		0.03	1	0.25	2.4mm	2 x 1.8 x 0.5
SDUA-400-030- 0100-K	USB Controlled	100 MHz - 40	0 - 30		1		0.1	2.92mm	2.25 x 1 x 0.33
FMAT3902	USB Controlled	200 MHz - 6	0 - 95	8	1	1,000	0	SMA	
FMAT5003	CMOS Controlled	DC - 13	0 - 31.5	5	0.5		0.32	SMA	1.035 x 0.68 x 0.34
FMAT8001	Relay Controlled	DC - 1	0 - 31.5	1.5	0.5	6,000,000	1	SMA	
FMAT8000	Relay Controlled	DC - 1	0 - 63	1.5	1	6,000,000	0.5	SMA	
FMAT8004	Relay Controlled	DC - 1	0 - 127	2.5	1	6,000,000	1	F	
FMAT8005	Relay Controlled	DC - 1.5	0 - 127	3.2	1	6,000,000	1	SMA	
FMAT8002	Relay Controlled	DC - 2	0 - 63.75		0.25	6,000,000	0.5	SMA	

Step Attenuators-Rotary

FM P/N	Maximum Power (Watts)	Connector Input	Connector Output	Frequency Range (GHz)	Construction Material		_	Step Size (dB)
FMAT1024	2	BNC Female	BNC Female	DC - 2.2	Aluminum	DC - 1: 1.2:1 1 - 2.2: 1.4:1	0 - 10	1.0
FMAT1022	2	BNC Female	BNC Female	DC - 2.2	Aluminum	DC - 1: 1.2:1 1 - 2.2: 1.4:1	0 - 70	10.0

Amplifiers

Bench-Top Amplifiers

FM P/N	Amplifier Type		(dB)	Gain Variation +/-(dB)				(Voltage/Cycle)	Mechanical Dimensions L(in) x W(in) x H(in)	Connector Type	ECCN
FMAM3037	Bench-Top, Broadband, High Rel	10 MHz - 15	12	0.3	4	28	16 / 360		4.23 x 1.7 x 1.68	SMA	EAR99
FMAM3500	Bench-Top, High Gain, High Rel	1-20	60	3	5	10		115 / 60	4.92 x 4.92 x 2.1	SMA	EAR99
FMAM3595	Bench-Top, High Gain, High Rel	1 - 40	40	2.5	5	22	12 /	120 / 60	4.92 x 4.92 x 2.1	2.92mm	EAR99

Variable Gain Amplifiers

FM P/N	Amplifier Type	Frequency Band (GHz)	Gain (dB)	Gain Variation +/-(dB)	NF (dB)	Atten. Range (dB)	Step Size (dB)	P1dB (dBm)	AC Power (VAC)	Mechanical Dimensions L(in) x W(in) x H(in)	Туре	ECCN
FMAT7000	Variable Gain, High Rel	100 MHz - 18	50	2	6.5	0 - 60	1	14	120	19 x 10.79 x 1.73	SMA	EAR99
FMAM7001	Variable Gain	500 MHz - 2	45	2	3.5			18			SMA	EAR99
FMAM7002	Variable Gain	500 MHz - 4	43	2	4			18			SMA	EAR99
FMAM7009	Variable Gain	1-18	48	3	3.5			17			SMA	EAR99



Variable Gain Amplifiers Continued

FM P/N	Amplifier Type	Frequency Band (GHz)	Gain (dB)	Gain Variation +/-(dB)	NF (dB)	Atten. Range (dB)	Step Size (dB)	P1dB (dBm)	AC Power (VAC)	Mechanical Dimensions L(in) x W(in) x H(in)	Туре	ECCN
FMAM7010	Variable Gain	1-26.5	43	4	5.5			11		1.39 x 1.4 x 0.4	SMA	EAR99
FMAM7011	Variable Gain	1 - 40	45	5	5			10		1.39 x 1.4 x 0.4	2.92mm	EAR99
FMAM7003	Variable Gain	2-6	42	2	2			16			SMA	EAR99
FMAM7004	Variable Gain	2-8	43	3	2.5			16			SMA	EAR99
FMAM7005	Variable Gain	4-12	47	3	3.5			17			SMA	EAR99
FMAM7006	Variable Gain	6-18	45	3	3			16			SMA	EAR99
FMAM7007	Variable Gain	18 - 26.5	45	3	5.5			15		1.4 x 1.39 x 0.4	SMA	EAR99
FMAM7012	Variable Gain	18 - 40	48	5	5			11		1.4 x 1.39 x 0.4	2.92mm	EAR99
FMAM7008	Variable Gain	26.5 - 40	46	4	5			11		1.4 x 1.39 x 0.4	2.92mm	EAR99

USB Controlled Broadband Amplifiers

	Amplifier Type	Frequency Band (GHz)	Gain (dB)	NF (dB)	P1dB (dBm)			Туре	ECCN
SBUA-180-12-010- SMA	USB, USB	50 MHz - 18	12	4.5	10	USB	2.25 x 1 x 0.33	SMA	EAR99
SBUA-400-12- 010-K	USB, USB	50 MHz - 40	12	5	10	USB	2.25 x 1 x 0.33	2.92mm	EAR99

High Isolation USB Controlled PIN Diode Switches

	Switch Type	Switch Design	Frequency Band (GHz)	Insertion Loss (dB)	Isolation (dB)	Power Handling (dBm)	Mechanical Dimensions L(in) x W(in) x H(in)	Connector	ECCN
SDUS-0518-SPDT- SMA	USB 2.0	SPDT	500 MHz - 18	6	60	20	2.25 x 1 x 0.33	SMA Female	EAR99
SDUS-0540- SPDT-K	USB 2.0	SPDT	500 MHz - 40	6	60	20	2.25 x 1 x 0.33	2.92mm Female	EAR99

Positive Slope Equalizers

FM P/N	Frequency Range (GHz)	Typical Equalizing Value (dB)	Typical Small Signal Insertion Loss (dB)	Typical Input-Output VSWR	Maximum RF Input Power (dBm)	Input-Output Connectors (Field Replaceable)
FMAT9000	500 MHz - 2	2	1.4	1.8:1	+30	SMA Female
FMAT9001	500 MHz - 2	4	1	1.8:1	+30	SMA Female
FMAT9002	500 MHz - 2	6	1.8	1.8:1	+30	SMA Female
FMAT9003	1 - 18	4	1	1.8:1	+30	SMA Female
FMAT9004	1 - 18	6	1	1.8:1	+30	SMA Female
FMAT9005	1 - 18	8	1.5	1.8:1	+30	SMA Female
FMAT9006	2 - 6	2	1	1.8:1	+30	SMA Female
FMAT9007	2 - 6	4	1.5	1.8:1	+30	SMA Female
FMAT9008	2 - 12	4	1.5	1.8:1	+30	SMA Female



Positive Slope Equalizers Continued

FM P/N	Frequency Range (GHz)	Typical Equalizing Value (dB)	Typical Small Signal Insertion Loss (dB)	Typical Input-Output VSWR	Maximum RF Input Power (dBm)	Input-Output Connectors (Field Replaceable)
FMAT9009	2 - 12	8	1.5	1.8:1	+30	SMA Female
FMAT9010	6 - 18	2	1.5	1.8:1	+30	SMA Female
FMAT9011	6 - 18	4	1.5	1.8:1	+30	SMA Female
FMAT9012	6 - 18	6	2	1.8:1	+30	SMA Female
FMAT9013	6 - 18	8	1.5	1.8:1	+30	SMA Female
FMAT9014	18 - 40	2	2	1.8:1	+30	2.92mm Female
FMAT9015	18 - 40	4	2	2:1	+30	2.92mm Female
FMAT9016	18 - 40	6	2	2:1	+30	2.92mm Female
FMAT9017	26.5 - 40	4	3	2:1	+30	2.92mm Female
FMAT9018	26.5 - 40	5	2.5	2:1	+30	2.92mm Female

Phase Shifters

8 Bit Programmable Phase Shifters

FM P/N	Connector	Gender		Deg. Phase Adjustment per GHz (Degrees)		Maximum VSWR
SDPS-0618-360- SMA	SMA	Female	6 - 18	360	12	2:1

Adjustable Phase Shifters

FM P/N	Connector			Power Rating (Watts)		Maximum VSWR
FMPH1000	2.92mm	Female	18 - 40	100	2.5	2:1
SMP0820	SMA	Female	DC - 8,200	100	0.6	1.5:1
<u>SMP1801</u>	SMA	Female	DC - 18	100	1	1.6:1

Analog Phase Shifters

FM P/N	Connector			Deg. Phase Adjustment per GHz (Degrees)	Maximum Insertion Loss (dB)
FMPS2001	SMA	Female	6 - 15	120	10
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Waveguide Antennas

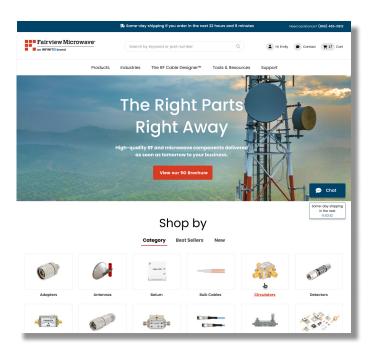
Specialty Waveguide Antennas

FM P/N	Waveguide Type	RF Frequency Range (GHz)	Gain (dB)	Flange Type	ECCN
SH0118S	Broadband	1-18	11 dBi	SMA Connectors	EAR99
SH0118N	Broadband	1 - 18	11 dBi	N Connectors	EAR99

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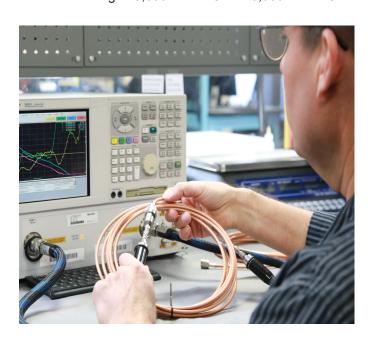
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