Radiall™

Our Most Important Connection is with You.™

CABLE ASSEMBLIES

SHF Cable Assemblies

Full Line Catalog

Connectivity has a profound and dramatic impact on the lives of people throughout the world. Because of advancements in technology, **our** lives are more convenient, more secure, more enjoyable and richer than ever. The speed of data enables communication in the **most** remote areas so people can reach all corners of the globe, allows for **important** defense and security, and facilitates space exploration. But technology doesn't just happen. It starts in the mind with ideas, making **connection**s never considered in ways that nobody dreamed possible. Seeing the future in ways previously unimagined **is** the act of innovation and it begins with people –the inventors, the dreamers, the pioneers and the engineers– enriching the lives of billions. At Radiall, we have one single, solitary mission; Empower the people that enrich our lives. Enable their innovation by providing reliability and durability. Give them useful information and provide them with valuable guidance when determining the best course for success. We don't invent the future, we enable it. We inspire innovation, we embrace challenges, we challenge the conventional and we collaborate **with** you to succeed. At Radiall, we're proud to say – Our most important connection is with **you.**

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Company Profile

Our Most Important Connection is with You™

Radiall is a global leader in the design, development and manufacturing of leading edge interconnect solutions. Dedicated to understanding its customers' needs since 1952, Radiall has earned the reputation of being "the best of the best" in engineering ingenuity by providing a constant flow of creative system solutions serving the defense, telecommunications, aerospace, instrumentation, automotive, industrial, medical and broadcast markets.

Best Value-added Services

Collaboration: We work closely with your engineers to understand your business, your technical needs, and your budgetary issues.

Wide Product Range: We manage our product lines thru the entire lifecycle in order to offer you a wide selection of standard products at an affordable cost.

Custom Products: We can tailor products to specific equipment and application needs.

Global Presence: We're everywhere you need us, with worldwide sales, engineering support, R&D in North America, Europe, and Asia, and manufacturing facilities strategically located in the United States, Mexico, France, India, and China.

Responsive Support and Service: From the design stage, planning to post-installation support, we're with you at every step, whether you need sales support or engineering expertise.

On-time Delivery: We support your logistical needs so you get the products when and where you need them.

Warranty: We proudly stand behind our products.

The Best End-to-End Interconnect Solutions

We offer an extensive range of solutions that supports the most demanding signal transmission applications. 4G wireless infrastructure, active array radars, IED's detection, electrical wiring in aircrafts, soldier tactical radios, in-vehicle communications networks, and magnetic resonance imaging systems are just a few of the complex applications that we support.

- *RF coaxial connectors*
- *Fiber optic connectors and transceivers*
- *Coaxial and fiber optic cable assemblies and harnesses*
- *High frequency microwave components*
- *Coaxial switches, including the smallest and most reliable SPDT relay*
- *Multipin rectangular connectors*
- *Rack and panel connectors*
- *Antennas for tactical networks, aerospace and instrumentation*

Certifications and Environmental

Radiall is ISO 9001: 2008 certified and dedicated to continuous improvement programs that have resulted in also being AS9100, TS16949 and ISO 14001 certified. In addition, Radiall is committed to investing in its people, future technologies and the environment, such as being RoHS (Restriction of Hazardous Substances) and REACH (Registration, Evaluation, Authorization and Restriction of Chemical substances) compliant.

ISO 9001 Certified
AS/EN/JISQ9100-ISOTS 16949-ISO-14001

Technical information and sales contacts are available at :
www.radiall.com

Radiall at a Glance

Worldwide Presence

Radiall has a global manufacturing presence. Our International sales network and qualified distributors cover every region around the world. The result is quick and insightful answers to all your requests.

- *International Sales Network*
- *Low cost facilities*
- *Local manufacturing, logistics and technical support*

North America

Asia

Europe

Market Focus

Aerospace

Defense

Industrial

Space

Telecom

Instrumentation

Medical

Radiall Technologies

- *Milling*
- *Plating & plastic metallization*
- *Molding*
- *Characterization*
- *Polishing*
- *Laser, ultrasonic, vapor, soldering*
- *Stamping*
- *Thin & thick film processes*
- *Etching on Si*
- *Thick film on AlN*
- *Test & measurement*
- *Simulation*
- *Cable & PTFE wrapping*
- *Automatic assembly*
- *Micro-machining*

A Global Range to Meet Your Needs

RF Coaxial Connectors

Radiall proudly offers the widest range of RF Coaxial Connectors in the Industry with over 12,000 part numbers and 72 product series including **AEP®** Mil QPL connectors. These precision-made components are a significant part of our heritage and essential to who we are.

Microwave Components

Radiall has a wide range of coaxial devices, including terminations, attenuators, and couplers using standard interfaces from low to high power. Our state of the art techniques enable us to produce microwave components for use in commercial, military, and space applications.

Multipin Connectors

Radiall has an unmatched range of rack and panel connectors and the most innovative modular and tool-less connectors used in harnesses and equipment connections. Our modern designs combine light weight, high performance levels and user friendly features to simplify even the most complex connections.

Space Qualified

Industry leaders across the globe recognize the Radiall brand for quality, reliability, and performance. Our Space Qualified passive product offering includes a wide range of coaxial connectors, cable assemblies, microwave components, and switches with a frequency range up to Ka band.

Harnesses

The combination of design and manufacturing of RF and microwave cables as well as multipin connectors (EPX, ARINC 404 and 600) allows Radiall to be a specialist of harnesses for onboard or land equipment or communications systems. All types of contacts can be used and mixed such as signal, power, RF, quadrax, fiber optic...

RF & Microwave Switches

All Radiall switches provide exceptional reliability and performance. A unique modular and patented design of the actuator and transmission link enables Radiall to guarantee operation up to 10 million cycles with excellent repeatability, while reducing delivery times.

Antennas

Radiall provides highly reliable antenna solutions for industrial and military applications. Our solutions include Line-Of-Sight tactical communications, vehicular mount, GPS, telemetry, and mesh networks. For optimum performance requirements, Radiall offers custom antenna solutions and support.

RF Cable Assemblies

Radiall has an extensive range of cable assemblies with outstanding electrical performance, low loss, and high frequency. Our range includes flexible, semi rigid and handformable cable assemblies. Our **TestPro™** range meets the stringent requirements needed for test and lab applications.

D-Lightsys®

Active Optical Solutions Optimized by D-Lightsys® for harsh environments. From optical transceivers to the world's smallest parallel optics, D-Lightsys® technologies support the most challenging applications, including harsh environments and avionics applications.

Fiber Optics

Radiall designs and supports high performance end-to-end Optical Interconnect solutions. Our offer includes standard interfaces, termini, connectors, harnesses and custom design optical links and subsystems. The flexibility and high quality of our product range supports harsh environments and demanding applications.

SHF Cable Assemblies

SHF is Radiall designed cable assembly brand since the early 80's. Both cable manufacturing and cable assembling are made in house with specific designed equipments. SHF Cables belong to PTFE microwave cables. This offer primarily focuses on performance and quality attributes and employs high temperature Teflon© materials and plated conductors which offer better performances than standard RG or Foam types coaxial cable.

SHF Cable Assemblies

The SHF cable assemblies family has been developed and continuously improved to fit applications such as ground defense, civil and military airborne, where the lowest loss, highest performance, best phase stability, excellent return loss as well as mechanical robustness are of the utmost importance.

The master of dielectric process technology significantly improves the electrical properties of the product. Other highlights include, excellent return loss and good phase stability.

Low Insertion Loss

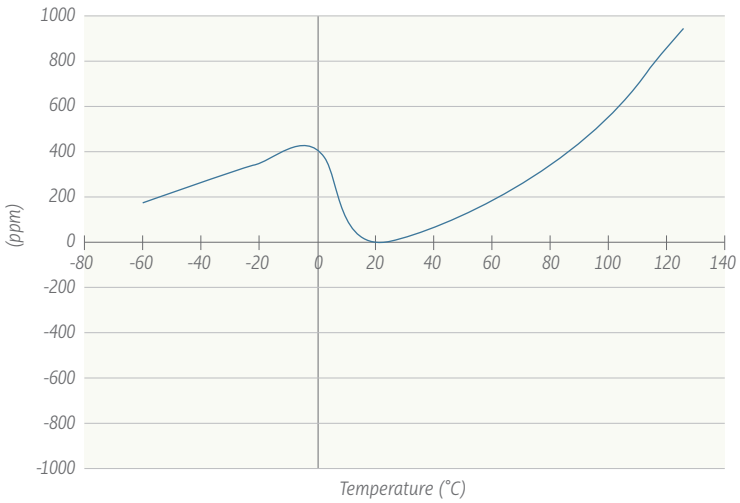
The construction of SHF cables is a solid silver-plated copper wire center conductor, encased by a wrapped ultra low density PTFE dielectric. Responsible for the shielding is a wrapped silver-plated copper tape, covered by a silver-plated copper braid. The cable is jacketed with Fluorinated Ethylene Propylene (FEP).

The expanded ultra low density PTFE dielectric is responsible for the loss performance of SHF cables. With a dielectric constant of εr = 1.40, most of SHF cables are claimed to deliver the lowest insertion loss currently available in their class.

Phase change vs temperature

CW power capability and the phase stability versus temperature offer a great advantage in applications such as phased array antenna systems and also helps to simplify the adjustment of radars.

SHF5M - SHF8M (Typ.)



Environmental Versions

The SHF cable assemblies have been specifically developed for defense systems. Based on the same RF line performance different environmental versions are available:

- *General Interconnect (GI) for protected environment*
- *OutDoor (OD) for ground and navy systems*
- *Armored (A) for harsh mechanical resistance*
- *LightWeight (LW) and AirFrame (AF) for airborne applications*

Application Codes

Several cables belong to different environmental versions. For each cable we identify an application code using the following table:

- *(A) Armored*
- *(AHD) Armored Heavy Duty*
- *(AF) AirFrame*
- *(GI) General Interconnect*
- *(LW) LightWeight*
- *(OD) OutDoor*
- *(UF) Ultra Flexible*
- *(ULL) Ultra Low Loss*

Selection Guide and Application

Applications

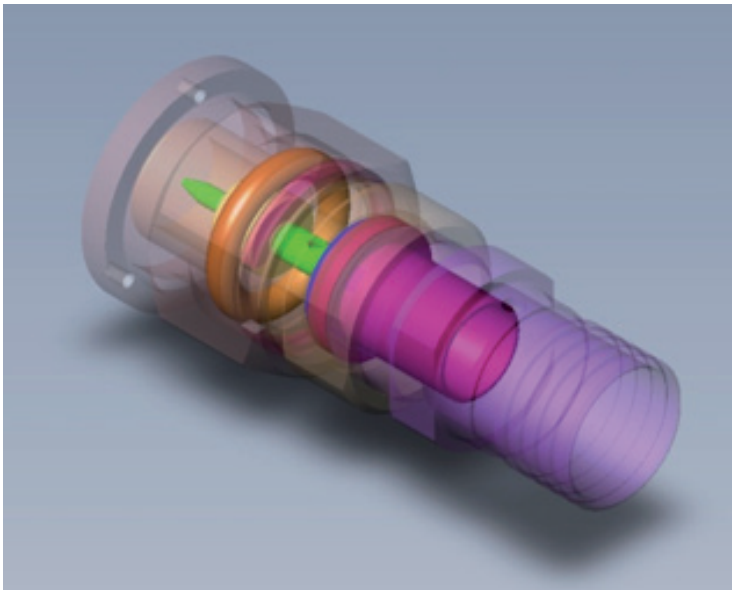
SHF cable assemblies are suitable for different applications. In defense technology, its main use is in tactical and strategic communications, electronic warfare and radar systems. Phase-matched cable assemblies are often required for radar applications. Complete sets of phase-matched, time-delay-matched or amplitude-matched SHF cable assemblies are available.

Also, the special characteristics of this cable assembly family are likely to make it the preferred solution for all industrial applications where lowest loss is crucial for customer specific installations.

To select the right range of cable please follow the selection guide below:

Ground & Navy	Indoor	Regular	Select General Interconnect with solid center conductor for static application. Prefer stranded center conductor for dynamic application.
		High Stress	Armored cables (MA/10, MR or PJ) with solid center conductor for static application. Prefer stranded center conductor cable with PJ option for dynamic application.
	Outdoor	Regular	Outdoor cables (MOD) for static application. Prefer stranded center conductor (OD) for dynamic application.
		High Stress	Armored cables with MPJ option for static application. Prefer stranded center conductor (PJ) for dynamic application.
Aero	Pressurized	Regular	Select General Interconnect range. Prefer solid center conductor for loss performances. FAR 25, Boeing & Airbus Smoke, fire and toxicity qualified.
		Lightweight	Select MLW-2 cables provide the best weight/ performance ratio. Up to 30% weight saving.
	Non-pressurized		Select MAF-2 cables. Hermeticity, abrasion and fluid resistant. FAR 25, RTCA DO 160 qualified.
Test & Measurement	Bench test		Please refer to our TestPro catalog. Bench test TestPro assemblies offer the upmost performances on the market. They differ from standard cable assemblies in the fact that they are especially designed for applications that require repeated connection/disconnection procedures, strenuous flexing situations and applications.
	Ultra low loss		TestPro 5 and TestPro 8 provide the highest performance in loss while benefiting from a reinforced structure.

Connectors



Connectors

The unique design of SHF cables dictates the use of custom-designed connectors. We pay particular attention to design of the compensation area and to termination techniques to assure low VSWR and thus to supplement our superior cable performance.

Our Cable/Connector terminations are designed to maintain shield integrity into the connectors to provide the lowest leakage in a flexible assembly. All electrical connections (center contact and inner tape shield) are soldered. There is a large number of cable and connector configurations to choose from.

Most popular connector interfaces fitting to SHF cables are SMPM, SMP, SSMA, SMA, QRE, TNC and N Type.

Typical SMPM connectors:

Straight plug

Right angle plug

30% smaller than SMP, SMPM connectors are designed for applications where space and package density are a necessity.

Radiall SMPM series meets MIL STD 348, figure 328 interface standard. They are intermateable with GPO® (Gilbert Engineering Inc.).

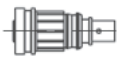
Most popular SHF cables with SMPM connectors is: SHF2.4M.

Typical SMP and SMP Lock connectors:

Straight plug

Right angle plug

Straight jack



Straight lock plug

Right angle lock plug

SMP Lock, the ultimate secure connection, is an innovative design from Radiall. SMP-Lock is compatible with most standard SMP receptacle with a minor change on male interface. SMP Lock plugs provide a secured locked connection when mated with a SMP Lock receptacle.

Radiall SMP series meets MIL STD 348, figure 326 interface standard and DESC specifications 94007 & 94008. They are intermateable with GPO® (Gilbert Engineering Inc.).

Most popular SHF cables with SMP connectors are: SHF2.4M, SHF3, SHF3M.

Typical SSMA connectors:

20% smaller than SMA, SSMA connectors are well adapted to small diameter cables. They offer a secured screwed connection and allow more narrow connectors implantation than SMA.

Radiall SSMA series meets MIL-C-39012 STD

Most popular SHF cables with SSMA connectors are: SHF2.4M, SHF2.2UF.

Straight plug

Right angle plug

Straight bulkhead jack

Typical SMA connectors:

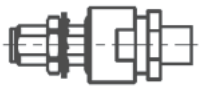
Radiall stainless steel SMA connectors are designed for applications where reliability, durability, robustness and high frequency are very important.

Radiall's SHF cables offer an extended frequency SMA range allowing coaxial system operation up to 27 GHz. This series mates with the standard SMA and SMA 3.5 series and maintains the same mechanical characteristics.

Radiall SMA series meets MIL-C-39012 STD

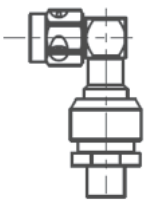
Most popular SHF cables with SMA connectors are: SHF2.4M, SHF3, SHF3M, SHF4.2M, SHF5, SHF5PJ, SHF5M, SHF5MPJ, SHF5MR, SHF5MA/10, SHF8, SHF8PJ, SHF8M, SHF8MPJ, SHF8MR, SHF8MA/10, SHF50D, SHF5M0D, SHF80D, SHF8M0D.

Straight plug

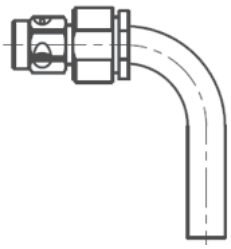


Straight bulkhead jack

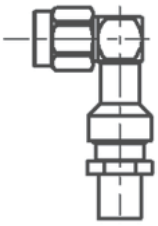
Low profile straight plug



Right angle plug



Swept plug



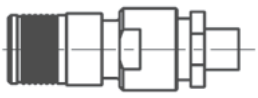
Low profile right angle plug

Typical QRE connectors:

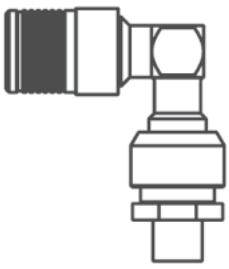
QRE is a Quick lock ruggedized connector. QRE was developed to provide the same advantages as QMA for aerospace and defense applications.

QRE is made of high grade stainless steel 316L, with Teflon coated fluorosilicone sealing o-rings making the QRE interface waterproof and ultra resistant to chemical aggression and corrosion.

Most popular SHF cables with QRE connectors are: SHF5MAF-2, SHF8MAF-2, SHF5MLW-2, SHF8MLW-2.



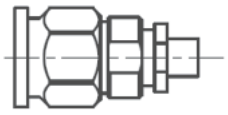
Straight plug



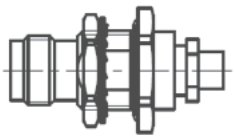
Right angle plug

Connectors

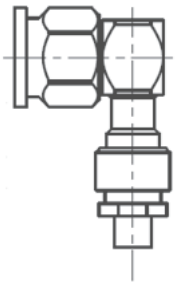
Typical TNC Connectors:



Straight plug



Straight bulkhead jack



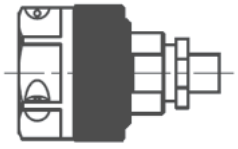
Right angle plug

Radiall's SHF cables offer an extended frequency TNC range allowing coaxial system operation up to 18 GHz. This series mates with the standard TNC series and maintains the same mechanical characteristics.

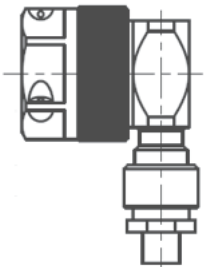
Radiall TNC series meets MIL-C-39012 STD

Most popular SHF cables with TNC connectors are SHF2.4M, SHF3, SHF3M, SHF4.2M, SHF5, SHF5PJ, SHF5M, SHF5MPJ, SHF5MR, SHF5MA/10, SHF8, SHF8PJ, SHF8M, SHF8MPJ, SHF8MR, SHF8MA/10, SHF13, SHF13A, SHF50D, SHF5M0D, SHF80D, SHF8M0D.

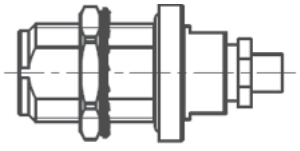
Typical N Type Connectors



Straight plug



Right angle plug



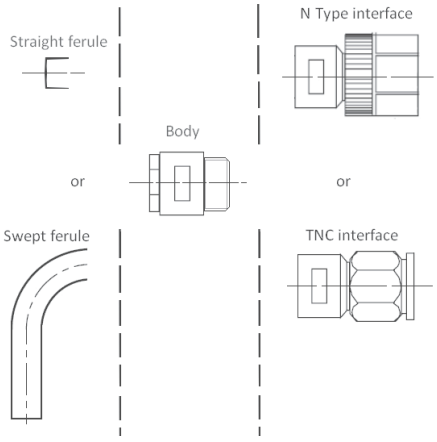
Straight bulkhead jack

Suitable for medium to high power applications and precision microwave test equipment. Radiall's SHF N Type connectors are characterized by long life duration and enhanced electrical performance in severe environmental conditions. This extended frequency N18 series mates with all 50 ohms N connectors.

Radiall N series meets MIL-C-39012 STD.

Most popular SHF cables with N Type connectors are: SHF2.4M, SHF3, SHF3M, SHF4.2M, SHF5, SHF5PJ, SHF5M, SHF5MPJ, SHF5MR, SHF5MA/10, SHF8, SHF8PJ, SHF8M, SHF8MPJ, SHF8MR, SHF8MA/10, SHF13, SHF13A, SHF50D, SHF5M0D, SHF80D, SHF8M0D.

Typical TNC and N Type replaceable



Straight or swept plug

For specific applications where customers face difficulties to root cable assemblies on the system (sea ship, aircraft, etc....) Radiall offers the possibility to install cable assemblies with a narrow termination and then to finish the assemblies on site with both N or TNC connector's male interface. Those connectors can be straight or swept.

SECTION 1

General Interconnect Low Loss Cables

General Interconnect Low Loss Cables

General Interconnect SHF cable range defines all standard SHF cable electrical lines and performance. The range of cables covers the upper limit of the diameters for very low loss cables in this class. SHF cables are dedicated to all applications where minimal electrical loss is vital, as well as having a high level of phase stability in a broad temperature range.

Today SHF cables meet the highest performances in low loss

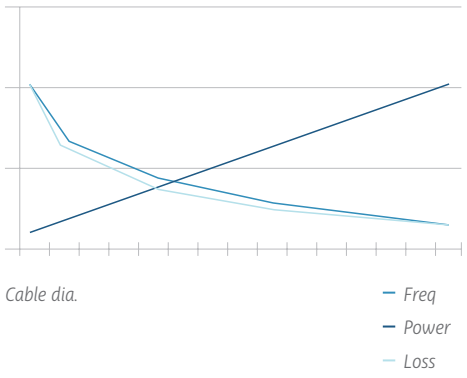
- *DC – 9.5 GHz SHF13 0.33dB/m – 10.00 dB/100ft*
- *DC – 18 GHz SHF8M 0.68dB/m – 20.92 dB/100ft*
- *DC – 26.5 GHz SHF5M 1.27dB/m – 38.56 dB/100ft*
- *DC – 32 GHz SHF4.6M 1.68 dB/m – 51.00 dB/100ft*
- *DC – 40 GHz SHF4M 2.05dB/m – 62.00 dB/100ft*

Cable Selection

The cable diameter selection (between 2.4mm and 13mm) is a balance between various parameters. Cable diameter affects:

- *Frequency band*
- *Attenuation*
- *Power handling*
- *Weight*
- *Flexibility*

Electrical parameters vs. Cable dimension



General Interconnect Table

General Interconnect Table

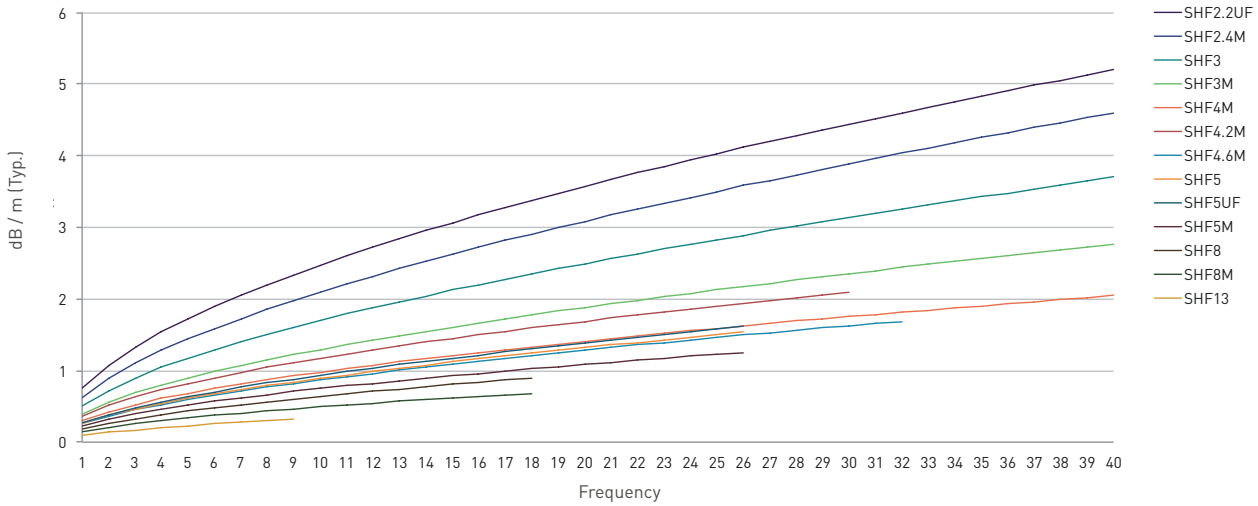
		SHF2.2UF	SHF2.4M	SHF3	SHF3M	SHF4M	SHF4.2M
Construction	Application Code	GI / UF	GI	GI	GI	GI / ULL	GI
	Center conductor	Stranded SPC	Solid SPC	Stranded SPC	Solid SPC	Solid SPC	Solid SPC
	Dielectric	PTFE tape	PTFE tape	PTFE tape	PTFE tape	Low density PTFE tape	PTFE tape
	Inner shield	SPC tape	SPC tape	SPC tape	SPC tape	SPC tape + Aluminium-polyimide foil	SPC tape
	Outer shield	SPC braid	SPC braid	SPC braid	SPC braid	SPC braid	SPC braid
	Jacket	PTFE	Green PFA	Green FEP	Green PFA	Black PFA	Green FEP
	Outer diameter (Max.)	2.25 mm / 0.089 in	2.45 mm / 0.095 in	3.50 mm / 0.138 in	3.64 mm / 0.139 in	4.15 mm / 0.160 in	4.20 mm / 0.165 in
Electrical Characteristics	Impedance	50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm
	Operating frequency range	DC - 40 GHz	DC - 40 GHz	DC - 40 GHz	DC - 40 GHz	DC - 40 GHz	DC - 30 GHz
	Velocity of propagation	79%	76%	76%	76%	84%	76%
	Time delay	4.25 ns/m; 1.29 ns/ft	4.4 ns/m; 1.3 ns/ft	4.4 ns/m; 1.3 ns/ft	4.4 ns/m; 1.3 ns/ft	4.0 ns/m; 1.2 ns/ft	4.4 ns/m; 1.3 ns/ft
	Capacitance at 1 GHz	85 pF/m; 25.8 pF/ft	87 pF/m; 26.4 pF/ft	85 pF/m; 25.8 pF/ft	88 pF/m; 26.7 pF/ft	79 pF/m; 24.1 pF/ft	91 pF/m; 27.6 pF/ft
	Screening effectiveness at 18 GHz	>70 dB	>90 dB	>90 dB	>90 dB	>90 dB	>90 dB
	Phase stability with bending	<0.6° / 360° / GHz	<0.4° / 360° / GHz	<0.4° / 360° / GHz	<0.4° / 360° / GHz	<0.4° / 360° / GHz	<0.4° / 360° / GHz
	Phase stability with temp.	<2°/m/GHz (-55 / +125°C)	<3°/m/GHz (-55 / +100°C)		<3°/m/GHz (-55 / +100°C)	<1.8°/m/GHz (-55 / +100°C)	<3°/m/GHz (-55 / +100°C)
	Attenuation stability with bending	<0.1 dB at 18 GHz; <0.25 dB at 40 GHz	<0.05 dB at 18 GHz; <0.1 dB at 40 GHz	<0.1 dB at 18 GHz; <0.2 dB at 40 GHz	<0.05 dB at 18 GHz; <0.1 dB at 40 GHz	<0.05 dB at 18 GHz; <0.15 dB at 40 GHz	<0.05 dB at 18 GHz; <0.1 dB at 30 GHz
	Att. variation with temp.	Att. (at X°C) = att.(at 20°C) x (1 + (X - 20) x 0.002)					
Mechanical	Maximum weight	14 g/m; 4.3 g/ft	14 g/m; 4.3 g/ft	29 g/m; 8.8 g/ft	35 g/m; 10.6 g/ft	40 g/m; 12.2 g/ft	45 g/m; 13.6 g/ft
	Min. bend radius	10 mm; 0.394 in	10 mm; 0.394 in	12.5 mm; 0.492 in	12.5 mm; 0.492 in	20 mm; 0.788 in	25 mm; 0.984 in
	Crush resistance		> 400 N / 100 mm	> 400 N / 100 mm	> 400 N / 100 mm	> 200 N / 100 mm	> 600 N / 100 mm
Environmental	Operating temp. range (*)	-70 / +200° C -94 / +392° F	-70 / +200° C -94 / +392° F	-70 / +200° C -94 / +392° F	-70 / +200° C -94 / +392° F	-70 / +200° C -94 / +392° F	-70 / +200° C -94 / +392° F
	Flammability	yes (MIL 87104)	J25/FAR25 853	J25/FAR25 853	J25/FAR25 853	J25/FAR25 853	J25/FAR25 853
	Halogen free jacket	No	No	No	No	No	No
Frequency/Attenuation	1 (dB /m - dB /ft)	0.75 - 0.23	0.62 - 0.19	0.51 - 0.15	0.39 - 0.12	0.3 - 0.09	0.36 - 0.11
	2	1.07 - 0.32	0.89 - 0.27	0.72 - 0.22	0.56 - 0.17	0.43 - 0.13	0.51 - 0.16
	4	1.53 - 0.46	1.28 - 0.39	1.04 - 0.32	0.8 - 0.24	0.61 - 0.19	0.73 - 0.22
	6	1.89 - 0.57	1.59 - 0.48	1.29 - 0.39	0.98 - 0.3	0.75 - 0.23	0.9 - 0.27
	8	2.20 - 0.67	1.86 - 0.57	1.51 - 0.46	1.15 - 0.35	0.87 - 0.27	1.04 - 0.32
	12.4	2.47 - 0.75	2.36 - 0.72	1.91 - 0.58	1.45 - 0.44	1.1 - 0.33	1.31 - 0.4
	18	3.37 - 1.02	2.91 - 0.89	2.35 - 0.72	1.77 - 0.54	1.33 - 0.41	1.6 - 0.49
	26.5	4.15 - 1.26	3.62 - 1.1	2.92 - 0.89	2.19 - 0.67	1.64 - 0.5	1.96 - 0.6
	32	4.60-1.39	4.03 - 1.23	3.25 - 0.99	2.44 - 0.74	1.82 - 0.55	
	40	5.20 - 1.58	4.59 - 1.4	3.7 - 1.13	2.76 - 0.84	2.05 - 0.62	
	Attenuation calculation (dB/m)	(0.74 x √F GHz) + (0.013 x F GHz)	(0.6 x √F GHz) + (0.02 x F GHz)	(0.49 x √F GHz) + (0.015 x F GHz)	(0.38 x √F GHz) + (0.009 x F GHz)	(0.2955 x √F GHz) + (0.0045 x F GHz)	(0.355 x √F GHz) + (0.005 x F GHz)

General Interconnect Table

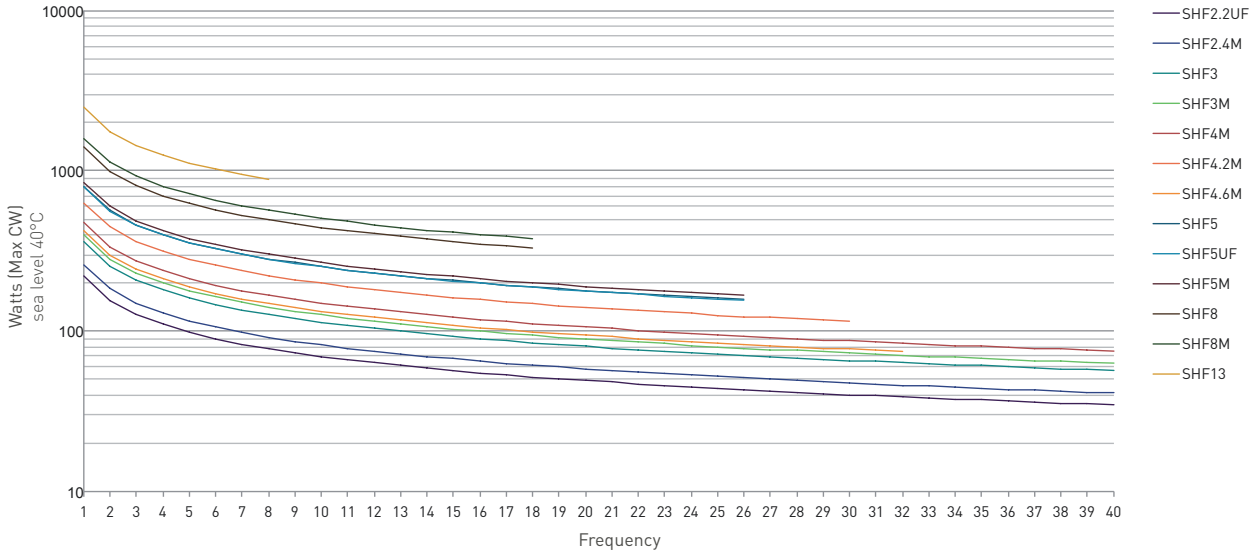
SHF4.6M	SHF5	SHF5M	SHF5UF	SHF8	SHF8M	SHF13
GI / ULL / LW	GI	GI / ULL	GI / UF	GI	GI / ULL	GI / ULL / LW
Solid SPCC AL	Stranded SPC	Solid SPC	Stranded SPC	Stranded SPC	Solid SPC	SPC Tube
Low density PTFE tape	PTFE tape	Low density PTFE tape	PTFE tape	PTFE tape	Low density PTFE tape	Low density PTFE Tape
SPC tape	SPC tape	SPC tape	SPC tape + PTFE tape	SPC tape	SPC tape	SPC tape
SPC braid	SPC braid	SPC braid	SPC braid	SPC braid	SPC braid	SPC braid
Green FEP	Green FEP	Green FEP	PTFE	Green FEP	Green FEP	Black PFA
4.65 mm / 0.183 in	5.25 mm / 0.203 in	5.20 mm / 0.201 in	5.47 mm / 0.215 in	7.80 mm / 0.303 in	7.78 mm / 0.302 in	13.80 mm / 0.543 in
50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm
DC - 32.3 GHz	DC - 26.5 GHz	DC - 26.5 GHz	DC - 26.5 GHz	DC - 18 GHz	DC - 18 GHz	100kHz - 9.5 GHz
84%	78%	84%	77%	78%	84%	85%
4.0 ns/m; 1.22 ns/ft	4.3 ns/m; 1.3 ns/ft	4.0 ns/m; 1.2 ns/ft	4.3 ns/m; 1.3 ns/ft	4.2 ns/m; 1.3 ns/ft	4.0 ns/m; 1.2 ns/ft	3.9 ns/m; 1.2 ns/ft
79.4 pF/m; 24.2 pF/ft	85 pF/m; 25.8 pF/ft	79 pF/m; 23.9 pF/ft	87 pF/m; 26.5 pF/ft	85 pF/m; 25.8 pF/ft	79 pF/m; 23.9 pF/ft	78 pF/m; 23.6 pF/ft
>90 dB	>90 dB	>90 dB	>90 dB	>90 dB	>90 dB	>90 dB (at 9.5 GHz)
<1° / 360° / GHz	<0.4° / 360° / GHz	<0.4° / 360° / GHz	<0.4° / 360° / GHz	<0.4° / 360° / GHz	<0.4° / 360° / GHz	<0.6° / 360° / GHz
<2°/m/GHz (-55 / +85°C)		<1°/m/GHz (-55 / +100°C)			<1°/m/GHz (-55 / +100°C)	
<0.05 dB at 18 GHz; <0.12 dB at 32 GHz	<0.1 dB at 18 GHz; <0.15 dB at 26.5 GHz	<0.05 dB at 18 GHz; <0.1 dB at 26.5 GHz	< 0.1 dB (at 18 GHz); < 0.15 dB (at 26.5 GHz)	<0.1 dB (at 18 GHz)	<0.05 dB (at 18 GHz)	<0.05 dB (at 18 GHz)
Att. (at X°C) = att.(at 20°C) x (1 + (X - 20) x 0.002)						
41 g/m; 12.5 g/ft	72 g/m; 21.8 g/ft	60 g/m; 18.2 g/ft	72g/m; 21.9 g/ft	140 g/m; 42.4 g/ft	130 g/m; 39.4 g/ft	280 g/m; 84.8 g/ft
25 mm; 0.984 in	25 mm; 0.984 in	25 mm; 0.984 in	25 mm; 0.984 in	40 mm; 1.575 in	40 mm; 1.575 in	60 mm; 2.362 in
> 200 N / 100 mm	> 400 N / 100 mm	> 200 N / 100 mm	> 400 N / 100 mm	> 400 N / 100 mm	> 200 N / 100 mm	> 600 N / 100 mm
-70 / +200° C -94 / +392° F	-70 / +200° C -94 / +392° F	-70 / +200° C -94 / +392° F	-70 / +200° C -94 / +392° F	-70 / +200° C -94 / +392° F	-70 / +200° C -94 / +392° F	-70 / +200° C -94 / +392° F
J25/FAR25 853	J25/FAR25 853	J25/FAR25 853	yes (MIL 87104)	J25/FAR25 853	J25/FAR25 853	J25/FAR25 853
No	No	No	No	No	No	No
0.25 - 0.08	0.26 - 0.08	0.23 - 0.07	0.27 - 0.08	0.18 - 0.05	0.15 - 0.04	0.09 - 0.03
0.36 - 0.11	0.37 - 0.11	0.32 - 0.1	0.39 - 0.12	0.26 - 0.08	0.21 - 0.06	0.14 - 0.04
0.52 - 0.16	0.54 - 0.16	0.46 - 0.14	0.56 - 0.17	0.38 - 0.12	0.3 - 0.09	0.2 - 0.06
0.65 - 0.2	0.67 - 0.2	0.57 - 0.17	0.70 - 0.21	0.48 - 0.15	0.37 - 0.11	0.26 - 0.08
0.76 - 0.23	0.79 - 0.24	0.66 - 0.2	0.82 - 0.25	0.56 - 0.17	0.44 - 0.13	0.3 - 0.09
0.98 - 0.3	1 - 0.31	0.84 - 0.26	1.05 - 0.32	0.72 - 0.22	0.55 - 0.17	
1.21 - 0.37	1.24 - 0.38	1.02 - 0,.31	1.30 - 0.40	0.9 - 0.27	0.68 - 0.21	
1.51 - 0.46	1.55 - 0.47	1.27 - 0.39	1.63 - 0.50			
1.69 - 0.51						
(0.242 x √F GHz) + (0.01 x F GHz)	(0.25 x √F GHz) + (0.01 x F GHz)	(0.22 x √F GHz) + (0.005 x F GHz)	(0.26 x √F GHz) + (0.011 x F GHz)	(0.17 x √F GHz) + (0.01 x F GHz)	(0.14 x √F GHz) + (0.005 x F GHz)	(0.087 x √F GHz) + (0.007 x F GHz)

General Interconnect Graphs

INSERTION LOSS



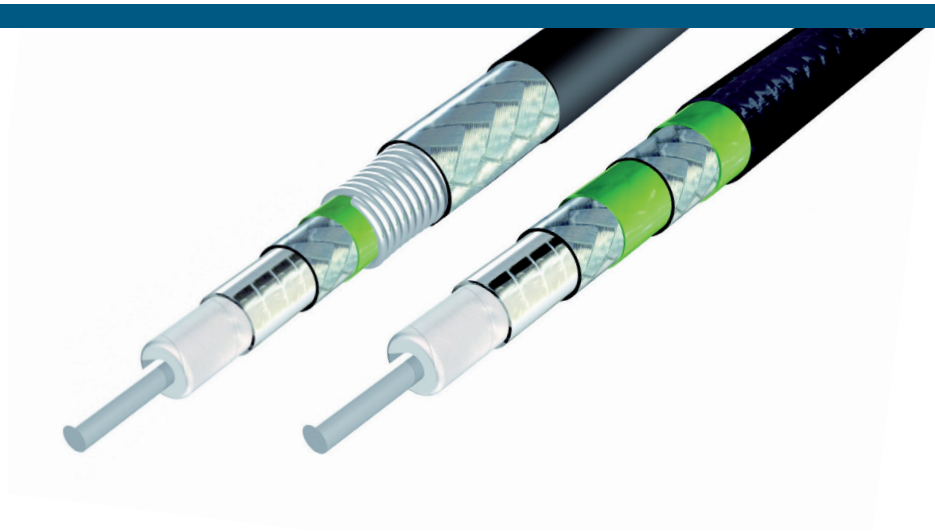
POWER HANDLING



Series	Gender	Type	SHF2.2UF	SHF2.4M	SHF3	SHF3M	SHF4M	SHF4.2M	SHF4.6M	SHF5	SHF5M	SHF5UF	SHF8	SHF8M	SHF13
SMPM	Plug (female)	Straight		■											
		Right-angle		■											
SMP-Lock	Plug (female)	Straight	■	■											
		Right-angle		■											
SMP	Plug (female)	Straight	■	■	■	■									
		Right-angle		■											
	Jack (male)	Straight		■											
		Straight Bulkhead		■											
SSMA	Plug	Straight	■	■											
		Right-angle	■	■											
	Jack	Straight Bulkhead		■											
MCX	Plug	Straight		■											
		Right-angle		■											
	Jack	Straight		■											
		Straight Bulkhead		■											
SMA	Plug	Straight	■	■	■	■		■		■	■	■	■	■	
		Right-angle		■	■	■		■		■	■		■	■	
		Swept			■	■		■		■	■		■	■	
	Jack	Straight		■	■	■		■		■	■				
		Straight Bulkhead		■	■	■		■		■	■		■	■	
SMA2.9	Plug	Straight	■	■	■	■	■		■						
		Swept					■								
	Jack	Straight Bulkhead		■	■	■	■								
SMA3.5	Plug	Straight					■								
		Swept					■								
	Jack	Straight Bulkhead					■								
QMA	Plug	Straight		■				■							
		Right-angle		■				■							
	Jack	Straight Bulkhead		■				■							
QN	Plug	Straight						■							
		Right-angle						■							
	Jack	Straight Bulkhead						■							
BMA	Plug	Straight		■				■		■	■				
		Straight Bulkhead		■				■		■	■				
	Jack	Straight		■				■		■	■				
TNC 18	Plug	Straight			■	■		■		■	■	■	■	■	■
		Right-angle								■	■		■	■	
		Swept			■	■				■	■		■	■	
	Jack	Straight Bulkhead						■		■	■		■	■	
N 18	Plug	Straight			■	■		■		■	■	■	■	■	
		Right-angle						■		■	■		■	■	
		Swept			■	■				■	■		■	■	
	Jack	Straight Bulkhead						■		■	■		■	■	

SECTION 2

Armored Low Loss Cables



Armored Low Loss Cables

From double jacketing to the highest level of protection (ProJack), the armored SHF range will resist high mechanical stress while providing first class electrical performance. Today, armored SHF cable assemblies are used on the heaviest defense and industrial environments where durability and reliability are essential. The Projack shielding protects SHF Ultra Low Loss cables and fully resists to crush, abrasion, and traction. Radiall's Projack also prevents from the kink effect and provides watertightness.

In many customer applications, mechanical stress may damage the cable assemblies and then decrease performance or make the system fail. Radiall has designed several levels of armored structures embedding SHF core lines.

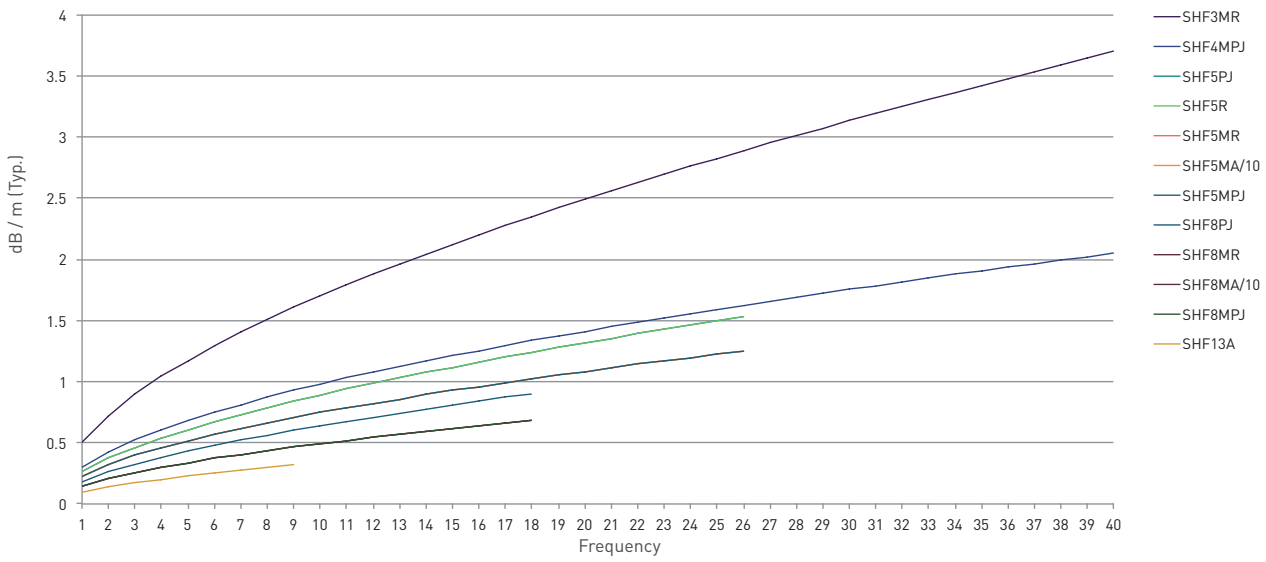
Armored Table

		SHF3MR	SHF4MPJ	SHF5PJ	SHF5R	SHF5MR
Construction	Application Code	A	AHD / OD / ULL	AHD / OD	A	A / ULL
	Center conductor	Solid SPC	Solid SPC	Stranded SPC	Stranded SPC	Solid SPC
	Dielectric	PTFE tape	Low density PTFE tape	PTFE tape	PTFE tape	low density PTFE tape
	Inner shield	SPC tape	SPC tape + Aluminum polyimide	SPC tape	SPC tape	SPC tape
	Outer shield	SPC braid	SPC braid	SPC braid	SPC braid	SPC braid
	Inner Jacket	Green PFA	Black PFA	Green FEP	Green FEP	Green FEP
	1st protection layer		Stainless Steel spring	Stainless Steel spring		
	2nd protection layer		Stainless Steel braid	Stainless Steel braid		
	Outer Jacket	Green PFA	Black PU	Black PU	Green FEP	Green FEP
	Outer diameter (Max.)	4.10 mm / 0.157 in	4.10 mm / 0.161 in	10.90 mm / 0.429 in	5.90 mm / 0.232 in	5.85 mm / 0.230 in
Electrical Characteristics	Impedance	50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm
	Operating frequency range	DC - 40 GHz	DC - 40 GHz	DC - 26.5 GHz	DC - 26.5 GHz	DC - 26.5 GHz
	Velocity of propagation	76%	84%	78%	78%	84%
	Time delay	4.4 ns/m; 1.3 ns/ft	4.0 ns/m; 1.2 ns/ft	4.3 ns/m; 1.3 ns/ft	4.3 ns/m; 1.3 ns/ft	4.0 ns/m; 1.2 ns/ft
	Capacitance at 1 GHz	88 pF/m; 26.7 pF/ft	79 pF/m; 24.1 pF/ft	85 pF/m; 25.8 pF/ft	85 pF/m; 25.8 pF/ft	79 pF/m; 23.9 pF/ft
	Screening effectiveness at 18 GHz	>90 dB	>90 dB	>90 dB	>90 dB	>90 dB
	Phase stability with bending	<0.4° / 360° / GHz	<0.4° / 360° / GHz	<0.4° / 360° / GHz	<0.4° / 360° / GHz	<0.4° / 360° / GHz
	Phase stability with temp.	<3°/m/GHz (-55 / +100°C)	<1.8°/m/Ghz (-55 / +100°C)	<4°/m/GHz (-55 / +100°C)	<1°/m/GHz (-55 / +100°C)	<1°/m/GHz (-55 / +100°C)
	Attenuation stability with bending	<0.05 dB at 18 GHz / <0.1 dB at 40 GHz	<0.05 dB at 18 GHz / <0.1 dB at 26.5 GHz	<0.1 dB at 18 GHz / <0.15 dB at 26.5 GHz	<0.1 dB at 18 GHz / <0.15 dB at 26.5 GHz	<0.05 dB at 18 GHz / <0.1 dB at 26.5 GHz
	Att. variation with temp.	Att. (at X°C) = att.(at 20°C) x (1 + (X - 20) x 0.002)				
Mechanical	Maximum weight	45 g/m - 14 g/ft	175 g/m - 53.4 g/ft	262 g/m - 79,4 g/ft	85 g/m - 25.9 g/ft	73 g/m - 22.1 g/ft
	Min. bend radius	12.5 mm - 0.492 in	20 mm - 0.788 in	25 mm - 0.984 in	25 mm - 0.984 in	25 mm - 0.984 in
	Crush resistance	> 1000 N / 100 mm	> 2 500 N / 100 mm	> 2500 N / 100 mm	> 800 N / 100 mm	> 700 N / 100 mm
Environmental	Operating temp. range (*)	-70 / +200° C -94 / +392° F	-55 / +100° C -67 / +212° F	-55 / +100° C -67 / +212° F	-70 / +200° C -94 / +392° F	-70 / +200° C -94 / +392° F
	Flammability	JAR25/FAR25853	JAR25/FAR25853	JAR25/FAR25853	JAR25/FAR25853	JAR25/FAR25853
	Halogen free jacket	No	No	No	No	No
Frequency/Attenuation	1 (dB /m - dB /ft)	0.51 - 0.15	0.3 - 0.09	0.26 - 0.08	0.26 - 0.08	0.23 - 0.07
	2	0.72 - 0.22	0.43 - 0.13	0.37 - 0.11	0.37 - 0.11	0.32 - 0.1
	4	1.04 - 0.32	0.61 - 0.19	0.54 - 0.16	0.54 - 0.16	0.46 - 0.14
	6	1.29 - 0.39	0.75 - 0.23	0.67 - 0.2	0.67 - 0.2	0.57 - 0.17
	8	1.51 - 0.46	0.87 - 0.27	0.79 - 0.24	0.79 - 0.24	0.66 - 0.2
	12.4	1.91 - 0.58	1.1 - 0.33	1 - 0.31	1 - 0.31	0.84 - 0.26
	18	2.35 - 0.72	1.33 - 0.41	1.24 - 0.38	1.24 - 0.38	1.02 - 0.31
	26.5	2.92 - 0.89	1.64 - 0.5	1.55 - 0.47	1.55 - 0.47	1.27 - 0.39
	32	3.25 - 0.99	1.82 - 0.55			
	40	3.7 - 1.13	2.05 - 0.62			
	Attenuation calculation (dB/m)	(0.49 x √F GHz) + (0.015 x F GHz)	(0.2955 x √F GHz) + (0.0045 x F GHz)	(0.25 x √F GHz) + (0.01 x F GHz)	(0.25 x √F GHz) + (0.01 x F GHz)	(0.22 x √F GHz) + (0.005 x F GHz)

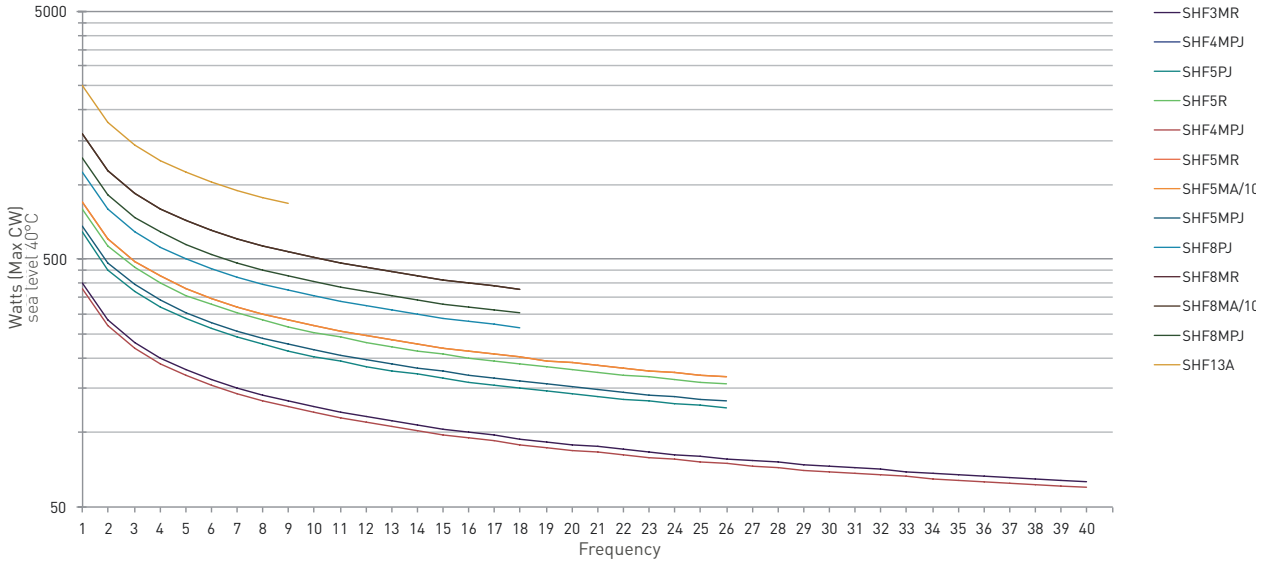
		SHF5MA/10	SHF5MPJ	SHF8PJ	SHF8MR	SHF8MA/10	SHF8MPJ	SHF13A
Construction	Application Code	A / ULL	AHD / OD / ULL	AHD / OD	A / ULL	A / ULL	AHD / OD / ULL	A / ULL
	Center conductor	Solid SPC	Solid SPC	Stranded SPC	Solid SPC	Solid SPC	Solid SPC	SPC Tube
	Dielectric	Low density PTFE tape	Low density PTFE tape	PTFE tape	Low density PTFE tape	Low density PTFE tape	Low density PTFE tape	PTFE tape
	Inner shield	SPC tape	SPC tape	SPC tape	SPC tape	SPC tape	SPC tape	SPC tape
	Outer shield	SPC braid	SPC braid	SPC braid	SPC braid	SPC braid	SPC braid	SPC braid
	Inner Jacket	Green FEP	Green FEP	Green FEP	Green FEP	Green FEP	Green FEP	PFA
	1st protection layer	Stainless Steel braid	Stainless Steel spring	Stainless Steel spring		Stainless Steel braid	Stainless Steel spring	Stainless Steel braid
	2nd protection layer	Green FEP	Stainless Steel braid	Stainless Steel braid		Green FEP	Stainless Steel braid	
	Outer Jacket	Black PA	Black PU	Black PU	Green FEP	Black PA	Black PU	Black PU
	Outer diameter (Max.)	7.20 mm / 0.280 in	10.90 mm / 0.429 in	14.80 mm / 0.583 in	8.50 mm / 0.331 in	10.10 mm / 0.390 in	14.80 mm / 0.583 in	17.60 mm / 0.693 in
Electrical Characteristics	Impedance	50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm
	Operating frequency range	DC - 26.5 GHz	DC - 26.5 GHz	DC - 18 GHz	DC - 18 GHz	DC - 18 GHz	DC - 18 GHz	100 kHz - 9,5 GHz
	Velocity of propagation	84%	84%	78%	84%	84%	84%	85%
	Time delay	4.0 ns/m ; 1.2 ns/ft	4.0 ns/m ; 1.2 ns/ft	4.2 ns/m ; 1.3 ns/ft	4.0 ns/m ; 1.2 ns/ft	4.0 ns/m ; 1.2 ns/ft	4.0 ns/m ; 1.2 ns/ft	3.9 ns/m ; 1.2 ns/ft
	Capacitance at 1 GHz	79 pF/m ; 23.9 pF/ft	79 pF/m ; 23.9 pF/ft	85 pF/m ; 25.8 pF/ft	79 pF/m ; 23.9 pF/ft	78 pF/m ; 23.6 pF/ft	79 pF/m ; 23.9 pF/ft	78 pF/m ; 23.6 pF/ft
	Screening effectiveness at 18 GHz	>90 dB	>90 dB	>90 dB	>90 dB	>90 dB	>90 dB	>90 dB
	Phase stability with bending	<0.4° / 360° / GHz	<0.4° / 360° / GHz	<0.4° / 360° / GHz	<0.4° / 360° / GHz	<0.4° / 360° / GHz	<0.4° / 360° / GHz	<0.6° / 360° / GHz
	Phase stability with temp.	<1°/m/GHz (-55 / +100°C)	<1°/m/GHz (-55 / +100°C)		<1°/m/GHz (-55 / +100°C)	<1°/m/GHz (-55 / +100°C)	<1°/m/GHz (-55 / +100°C)	
	Attenuation stability with bending	<0.05 dB at 18 GHz / <0.1 dB at 26.5 GHz	<0.05 dB at 18 GHz / <0.1 dB at 26.5 GHz	<0.1 dB (at 18 GHz)	<0.05 dB (at 18 GHz)	<0.05 dB (at 18 GHz)	<0.05 dB (at 18 GHz)	<0.05 dB
	Att. variation with temp.	Att. (at X°C) = att.(at 20°C) x (1 + (X - 20) x 0.002)						
Mechanical	Maximum weight	120 g/m - 36 g/ft	250 g/m - 75.8 g/ft	480 g/m - 145.4 g/ft	155 g/m - 47 g/ft	205 g/m - 62.1 g/ft	470 g/m - 142.4 g/ft	410 g/m - 124.2 g/ft
	Min. bend radius	60 mm - 2.362 in	25 mm - 0.984 in	40 mm - 1.575 in	40 mm - 1.575 in	100 mm - 3.937 in	40 mm - 1.575 in	90 mm - 3.543 in
	Crush resistance	> 1000 N / 100 mm	> 2500 N / 100 mm	> 2500 N / 100 mm	> 1000 N / 100 mm	> 1000 N / 100 mm	> 2500 N / 100 mm	> 800 N / 100 mm
Environmental	Operating temp. range (*)	-50 / +105° C -67 / +221° F	-55 / +100° C -67 / +212° F	-55 / +100° C -67 / +212° F	-70 / +200° C -94 / +392° F	-50 / +105° C -58 / +221° F	-55 / +100° C -67 / +212° F	-55 / +100° C -67 / +212° F
	Flammability	self-extinguishable	JAR25/FAR25853	JAR25/FAR25853	JAR25/FAR25853	self-extinguishable	JAR25/FAR25853	JAR25/FAR25853
	Halogen free jacket	Yes	No	No	No	Yes	No	No
Frequency/Attenuation	1 (dB /m - dB /ft)	0.23 - 0.07	0.23 - 0.07	0.18 - 0.05	0.15 - 0.04	0.15 - 0.04	0.15 - 0.04	0.09 - 0.03
	2	0.32 - 0.1	0.32 - 0.1	0.26 - 0.08	0.21 - 0.06	0.21 - 0.06	0.21 - 0.06	0.14 - 0.04
	4	0.46 - 0.14	0.46 - 0.14	0.38 - 0.12	0.3 - 0.09	0.3 - 0.09	0.3 - 0.09	0.2 - 0.06
	6	0.57 - 0.17	0.57 - 0.17	0.48 - 0.15	0.37 - 0.11	0.37 - 0.11	0.37 - 0.11	0.26 - 0.08
	8	0.66 - 0.2	0.66 - 0.2	0.56 - 0.17	0.44 - 0.13	0.44 - 0.13	0.44 - 0.13	0.3 - 0.09
	12.4	0.84 - 0.26	0.84 - 0.26	0.72 - 0.22	0.55 - 0.17	0.55 - 0.17	0.55 - 0.17	
	18	1.02 - 0.31	1.02 - 0.31	0.9 - 0.27	0.68 - 0.21	0.68 - 0.21	0.68 - 0.21	
	26.5	1.27 - 0.39	1.27 - 0.39					
	32							
	40							
	Attenuation calculation (dB/m)	(0.22 x √F GHz) + (0.005 x F GHz)	(0.22 x √F GHz) + (0.005 x F GHz)	(0.17 x √F GHz) + (0.01 x F GHz)	(0.14 x √F GHz) + (0.005 x F GHz)	(0.14 x √F GHz) + (0.005 x F GHz)	(0.14 x √F GHz) + (0.005 x F GHz)	(0.087 x √F GHz) + (0.007 x F GHz)

Armored Graphs

INSERTION LOSS



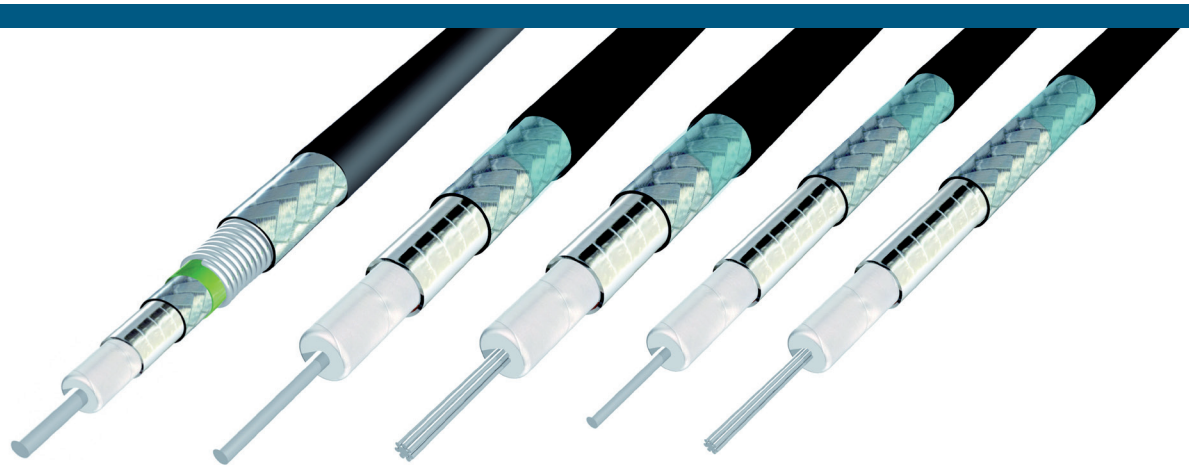
POWER HANDLING



Series	Gender	Type	SHF3MR	SHF4MPJ	SHF5PJ	SHF5R	SHF5MPJ	SHF5MR	SHF5MA/10	SHF8PJ	SHF8MPJ	SHF8MR	SHF8MA/10	SHF13A
SMA	Plug	Straight	■		■	■	■	■	■	■	■	■	■	
		Right-angle	■		■	■	■	■	■	■	■	■	■	
		Swept	■			■		■				■		
	Jack	Straight Bulkhead	■		■	■	■	■	■	■	■	■	■	
SMA2.9	Plug	Straight	■	■										
	Jack	Straight Bulkhead	■	■										
SMA3.5	Plug	Straight		■										
	Jack	Straight Bulkhead		■										
SMP	Plug (female)	Straight	■					■						
BMA	Plug	Straight Bulkhead				■		■						
	Jack	Straight				■		■						
TNC 18	Plug	Straight	■		■	■	■	■	■	■	■	■	■	■
		Right-angle			■	■	■	■	■	■	■	■	■	
		Swept				■		■				■		
	Jack	Straight Bulkhead			■	■	■	■	■	■	■	■	■	■
N 18	Plug	Straight	■		■	■	■	■	■	■	■	■	■	■
		Right-angle			■	■	■	■	■	■	■	■	■	
		Swept				■		■				■		
	Jack	Straight Bulkhead			■	■	■	■	■	■	■	■	■	■

SECTION 3

OutDoor Low Loss Cables



OutDoor

Using the superior qualities of its cables from the General Interconnect range, Radiall has developed an innovative range of specific cables dedicated to outdoor applications. Designed to be used in demanding environments while preserving their excellent electrical performances, Radiall's OutDoor cables are typically chosen for Ground Radars and Navy Systems.

Typical applications are antenna feeder and cable assemblies for radar system in ship-board as well as phase array radar for ground surveillance systems. For such applications Radiall has designed specific connector attachments for optimal and secured watertightness.

In addition to being Ultra Low Loss cables, OutDoor cables offer the following benefits:

- *High abrasion resistance*
- *Good flexibility (kink effect minimized)*
- *Resistance to permanent exposure to UV*
- *Long or/and repetitive water immersion*
- *High shielding effectiveness*

OutDoor Table

OutDoor Table

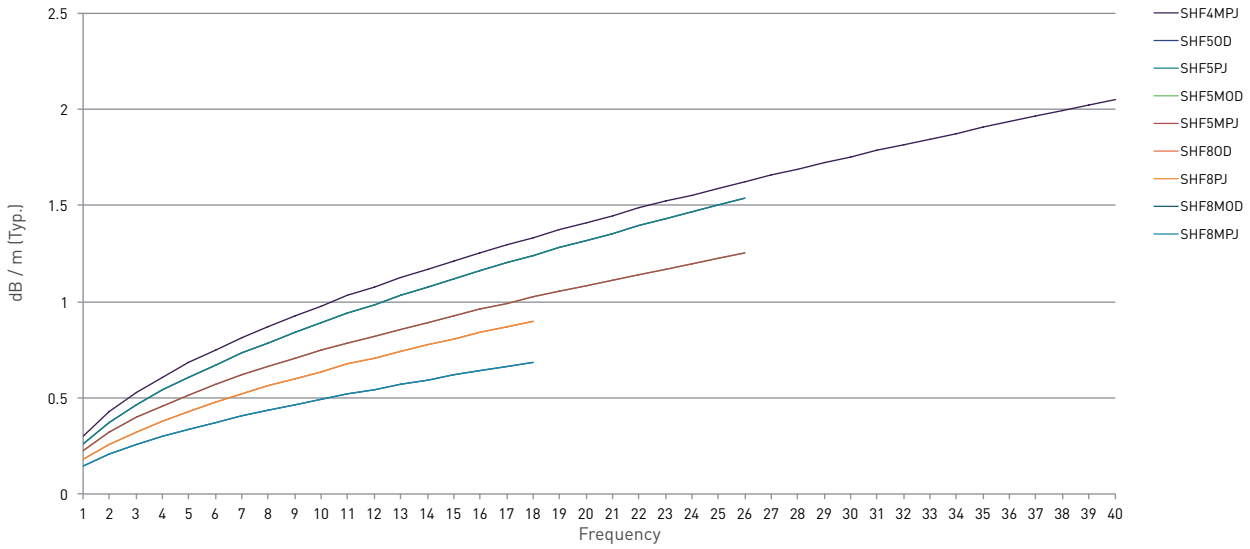
		SHF4MPJ	SHF5OD	SHF5PJ	SHF5MOD
Construction	Application Code	OD / ULL / AHD	OD	OD / AHD	OD / ULL
	Center conductor	Solid SPC	Stranded SPC	Stranded SPC	Solid SPC
	Dielectric	Low density PTFE tape	PTFE tape	PTFE tape	Low density PTFE tape
	Inner shield	SPC tape + Aluminum polyimide	SPC tape + Polyester tape	SPC tape	SPC tape + Polyester tape
	Outer shield	SPC braid	SPC braid	SPC braid	SPC braid
	Jacket	Black PU	Black PU	Black PU	Black PU
	Outer diameter (Max.)	4.10 mm / 0.161 inch	6.25 mm / 0.242 inch	10.90 mm / 0.429 inch	5.90 mm / 0.228 inch
Electrical Characteristics	Impedance	50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm
	Operating frequency range	DC - 40 GHz	DC - 26.5 GHz	DC - 26.5 GHz	DC - 26.5 GHz
	Velocity of propagation	84%	78%	78%	84%
	Time delay	4.0 ns/m ; 1.2 ns/ft	4.3 ns/m ; 1.3 ns/ft	4.3 ns/m ; 1.3 ns/ft	4.0 ns/m ; 1.2 ns/ft
	Capacitance at 1 GHz	79 pF/m ; 24.1 pF/ft	85 pF/m ; 25.8 pF/ft	85 pF/m ; 25.8 pF/ft	79 pF/m ; 23.9 pF/ft
	Screening effectiveness at 18 GHz	>90 dB	>90 dB	>90 dB	>90 dB
	Phase stability with bending	<0.4° / 360° / GHz	<0.4° / 360° / GHz	<0.4° / 360° / GHz	<0.4° / 360° / GHz
	Phase stability with temp.	<1.3°/m/GHz (-55 / +100°C)			<1°/m/GHz (-55 / +100°C)
	Attenuation stability with bending	<0.05 dB at 18 GHz / <0.1 dB at 26.5 GHz	<0.1 dB at 18 GHz / <0.15 dB at 26.5 GHz	<0.1 dB at 18 GHz / <0.15 dB at 26.5 GHz	<0.05 dB at 18 GHz / <0.1 dB at 26.5 GHz
	Att. variation with temp.	Att. (at X°C) = att.(at 20°C) x (1 + (X - 20) x 0.002)			
Mechanical	Maximum weight	175 g/m - 53.4 g/ft	78 g/m - 23.6 g/ft	262 g/m - 79,4 g/ft	68 g/m - 20.6 g/ft
	Min. bend radius	20 mm - 0.788 inch	25 mm - 0.984 inch	25 mm - 0.984 inch	25 mm - 0.984 inch
	Crush resistance	> 2 500 N / 100 mm	> 400 N / 100 mm	> 2500 N / 100 mm	> 400 N / 100 mm
Environmental	Operating temp. range (*)	-55 / +100° C -67 / +212° F	-55 / +100° C -67 / +212° F	-55 / +100° C -67 / +212° F	-55 / +100° C -67 / +212° F
	Flammability	JAR25/FAR25 853	JAR25/FAR25 853	JAR25/FAR25 853	JAR25/FAR25 853
	Halogen free jacket	No	No	No	No
Frequency/Attenuation	1 (dB /m - dB /ft)	0.3 - 0.09	0.26 - 0.08	0.26 - 0.08	0.23 - 0.07
	2	0.43 - 0.13	0.37 - 0.11	0.37 - 0.11	0.32 - 0.1
	4	0.61 - 0.19	0.54 - 0.16	0.54 - 0.16	0.46 - 0.14
	6	0.75 - 0.23	0.67 - 0.2	0.67 - 0.2	0.57 - 0.17
	8	0.87 - 0.27	0.79 - 0.24	0.79 - 0.24	0.66 - 0.2
	12.4	1.1 - 0.33	1 - 0.31	1 - 0.31	0.84 - 0.26
	18	1.33 - 0.41	1.24 - 0.38	1.24 - 0.38	1.02 - 0.31
	26.5	1.64 - 0.5	1.55 - 0.47	1.55 - 0.47	1.27 - 0.39
	32	1.82 - 0.55			
	40	2.05 - 0.62			
	Attenuation calculation (dB/m)	(0.2955 x √F GHz) + (0.0045 x F GHz)	(0.25 x √F GHz) + (0.01 x F GHz)	(0.25 x √F GHz) + (0.01 x F GHz)	(0,22 x √F GHz) + (0,005 x F GHz)

SHF5MPJ	SHF8OD	SHF8PJ	SHF8MOD	SHF8MPJ
OD / ULL / AHD	OD	OD / AHD	OD / ULL	OD / ULL / AHD
Solid SPC	Stranded SPC	Stranded SPC	Solid SPC	Solid SPC
Low density PTFE tape	PTFE tape	PTFE tape	Low density PTFE tape	Low density PTFE tape
SPC tape	SPC tape + Polyester tape	SPC tape	SPC tape + Polyester tape	SPC tape
SPC braid	SPC braid	SPC braid	SPC braid	SPC braid
Black PU	Black PU	Black PU	Black PU	Black PU
10.90 mm / 0.429 inch	8.60 mm / 0.335 inch	14.80 mm / 0.583 inch	8.60 mm / 0.335 inch	14.80 mm / 0.583 inch
50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm
DC - 26.5 GHz	DC - 18 GHz	DC - 18 GHz	DC - 18 GHz	DC - 18 GHz
84%	78%	78%	84%	84%
4.0 ns/m ; 1.2 ns/ft	4.2 ns/m ; 1.3 ns/ft	4.2 ns/m ; 1.3 ns/ft	4.0 ns/m ; 1.2 ns/ft	4.0 ns/m ; 1.2 ns/ft
79 pF/m ; 23.9 pF/ft	85 pF/m ; 25.8 pF/ft	85 pF/m ; 25.8 pF/ft	79 pF/m ; 23.9 pF/ft	79 pF/m ; 23.9 pF/ft
>90 dB	>90 dB	>90 dB	>90 dB	>90 dB
<0.4° / 360° / GHz	<0.4° / 360° / GHz	<0.4° / 360° / GHz	<0.4° / 360° / GHz	<0.4° / 360° / GHz
<1°/m/GHz (-55 / +100°C)			<1°/m/GHz (-55 / +100°C)	<1°/m/GHz (-55 / +100°C)
<0.05 dB at 18 GHz / <0.1 dB at 26.5 GHz	<0.1 dB at 18 GHz	<0.1 dB (at 18 GHz)	<0.05 dB (at 18 GHz)	<0.05 dB (at 18 GHz)
Att. (at X°C) = att.(at 20°C) x (1 + (X - 20) x 0.002)				
250 g/m - 75.8 g/ft	155 g/m - 47 g/ft	480 g/m - 145.4 g/ft	135 g/m - 40.9 g/ft	470 g/m - 142.4 g/ft
25 mm - 0.984 inch	40 mm - 1.575 inch	40 mm - 1.575 inch	40 mm - 1.575 inch	40 mm - 1.575 inch
> 2500 N / 100 mm	> 400 N / 100 mm	> 2500 N / 100 mm	> 400 N / 100 mm	> 2500 N / 100 mm
-55 / +100° C -67 / +212° F	-55 / +100° C -67 / +212° F	-55 / +100° C -67 / +212° F	-55 / +100° C -67 / +212° F	-55 / +100° C -67 / +212° F
JAR25/FAR25 853	JAR25/FAR25 853	JAR25/FAR25 853	JAR25/FAR25 853	JAR25/FAR25 853
No	No	No	No	No
0.23 - 0.07	0.18 - 0.05	0.18 - 0.05	0.15 - 0.04	0.15 - 0.04
0.32 - 0.1	0.26 - 0.08	0.26 - 0.08	0.21 - 0.06	0.21 - 0.06
0.46 - 0.14	0.38 - 0.12	0.38 - 0.12	0.3 - 0.09	0.3 - 0.09
0.57 - 0.17	0.48 - 0.15	0.48 - 0.15	0.37 - 0.11	0.37 - 0.11
0.66 - 0.2	0.56 - 0.17	0.56 - 0.17	0.44 - 0.13	0.44 - 0.13
0.84 - 0.26	0.72 - 0.22	0.72 - 0.22	0.55 - 0.17	0.55 - 0.17
1.02 - 0.31	0.9 - 0.27	0.9 - 0.27	0.68 - 0.21	0.68 - 0.21
1.27 - 0.39				
(0.22 x √F GHz) + (0.005 x F GHz)	(0.17 x √F GHz) + (0.01 x F GHz)	(0.17 x √F GHz) + (0.01 x F GHz)	(0.14 x √F GHz) + (0.005 x F GHz)	(0.14 x √F GHz) + (0.005 x F GHz)

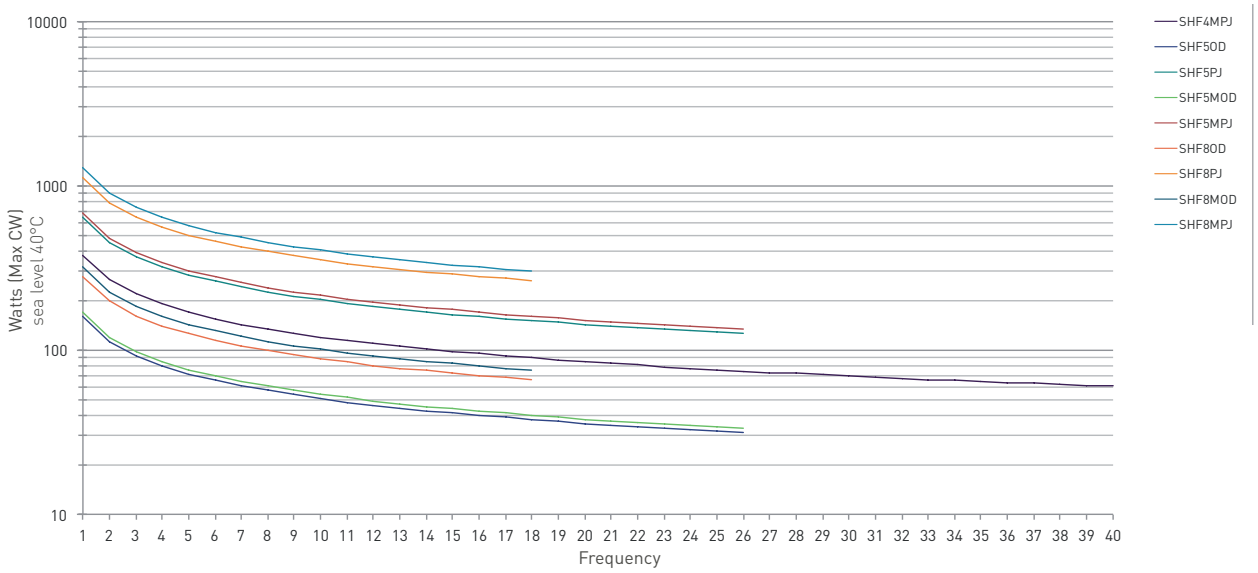
Go online for data sheets & assembly instructions. Visit **www.radiall.com** and enter the part number.

OutDoor Graphs

INSERTION LOSS



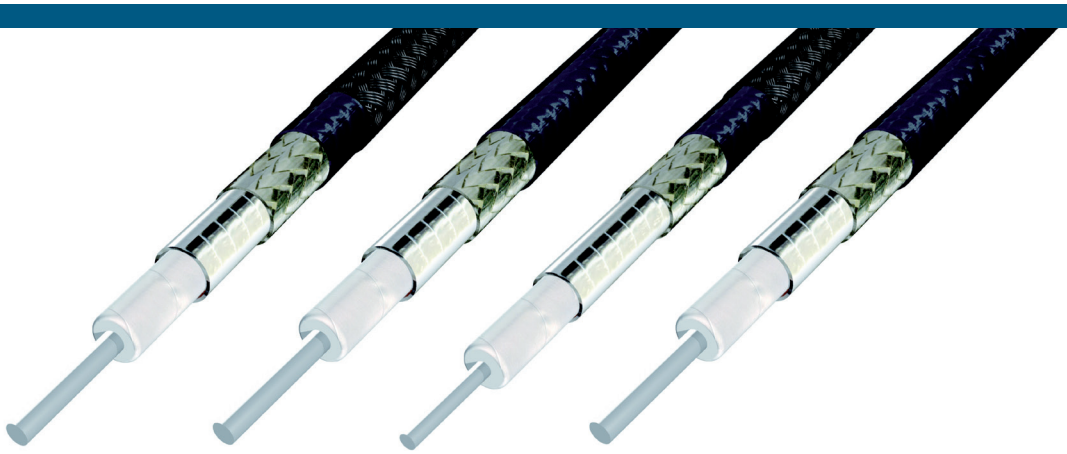
POWER HANDLING



Series	Gender	Type	SHF4MPJ	SHF5PJ	SHF5MPJ	SHF8PJ	SHF8MPJ	SHF50D	SHF5MOD	SHF80D	SHF8MOD
SMA	Plug	Straight		■	■	■	■	■	■	■	■
		Right-angle		■	■	■	■	■	■	■	■
	Jack	Straight Bulkhead		■	■	■	■	■	■	■	■
SMA 2.9	Plug	Straight	■								
	Jack	Straight Bulkhead	■								
SMA 3.5	Plug	Straight	■								
	Jack	Straight Bulkhead	■								
TNC 18	Plug	Straight		■	■	■	■	■	■	■	■
		Right-angle		■	■	■	■	■	■	■	■
	Jack	Straight Bulkhead		■	■	■	■	■	■	■	■
N 18	Plug	Straight		■	■	■	■	■	■	■	■
		Right-angle		■	■	■	■	■	■	■	■
	Jack	Straight Bulkhead		■	■	■	■	■	■	■	■

SECTION 4

LightWeight and AirFrame Low Loss Cables



LightWeight and AirFrame

Flat wire braid, and lighter wrapping make Radiall's LightWeight and AirFrame ranges the best choice for on-board equipment, where weight and density are critical. With the same optimal electrical performances as all SHF GI cables, the cables from these ranges not only offer a weight savings, but also a size savings. . Combine with innovative connectors such as QRE (Quick Lock Ruggudized connectors) they are ideal for high density systems. SHF AirFrame cables are selected for on-board surveillance systems, drones and fighter aircrafts. Radiall's cables are used in major Aircraft companies.

On-board equipment faces particularly harsh environment: high temperature, need for hermetically sealed cable assemblies, non-pressurized or not-protected areas. Radiall's AirFrame cable range combines the top performance level of its Ultra Low Loss and LightWeight cables and the highest resistance to abrasion on the market, due to innovative peek braid jackets.

SHF AirFrame cables are also fluid (Skyroll) resistant. Their moto is: Robustness for long life in extreme conditions. In surveillance aircraft applications, for example, AirFrame cable assemlblies meet the highest performance required (ultra Low Loss, accurate phase matching) while saving kilos.

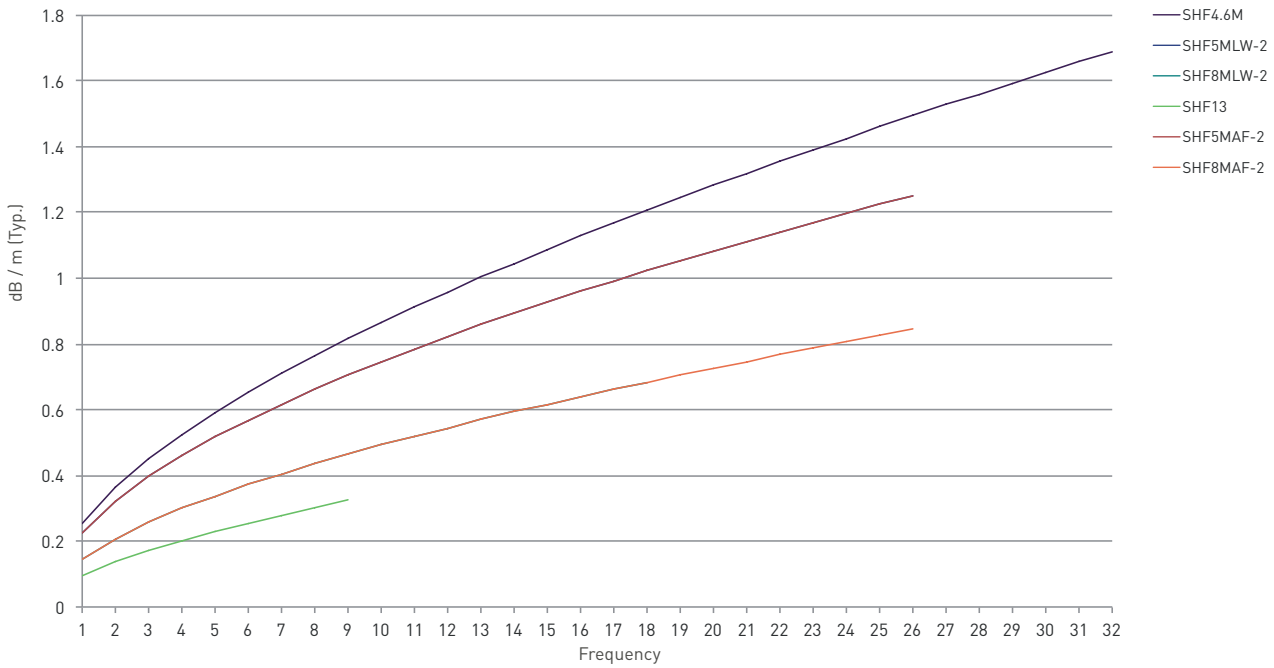
LightWeight and AirFrame Table

LightWeight and AirFrame Table

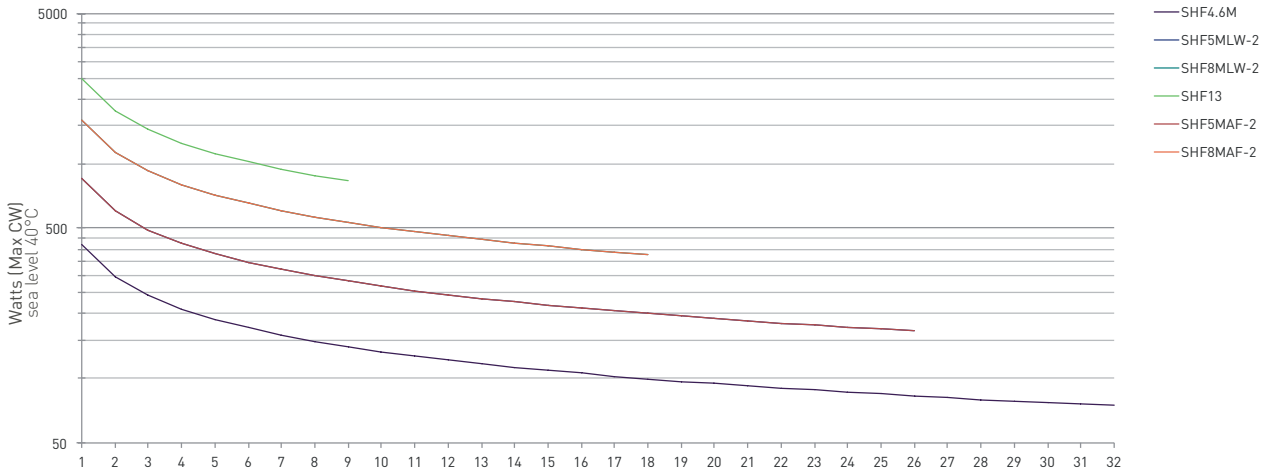
		SHF4.6M	SHF5MLW-2	SHF8MLW-2	SHF13	SHF5MAF-2	SHF8MAF-2
Construction	Application Code	LW / GI / ULL	LW / ULL	LW / ULL	LW / GI / ULL	AF / ULL	AF / ULL
	Center conductor	Solid SPCC AL	Solid SPCCA	Solid SPCCA	SPC Tube	Solid SPCCA	Solid SPCCA
	Dielectric	Low density PTFE tape	Low density PTFE tape	Low density PTFE tape	Low density PTFE tape	Low density PTFE tape	Low density PTFE tape
	Inner shield	SPC tape	SPC tape	SPC tape	SPC tape	SPC tape	SPC tape
	Outer shield	SPC braid	SPC flat braid	SPC flat braid	SPC braid	SPC flat braid + Black FEP	SPC flat braid + Black FEP
	Jacket	Green FEP	Black FEP	Black FEP	Black PFA	PEEK braid	PEEK braid
	Outer diameter (Max.)	4.65 mm / 0.183 inch	5.35 mm / 0.191 inch	7.45 mm / 0.293 inch	13.80 mm / 0.543 inch	6.00 mm / 0.230 inch	8.35 mm / 0.329 inch
Electrical Characteristics	Impedance	50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm	50 ohms ±1 ohm
	Operating frequency range	DC - 32.3 GHz	DC - 26.5 GHz	DC - 18 GHz	100kHz - 9.5 GHz	DC - 26.5 GHz	DC - 18 GHz
	Velocity of propagation	84%	83%	84%	85%	83%	84%
	Time delay	4.0 ns/m ; 1.22 ns/ft	4.0 ns/m ; 1.2 ns/ft	3.9 ns/m ; 1.2 ns/ft	3.9 ns/m ; 1.2 ns/ft	4.0 ns/m ; 1.2 ns/ft	3.9 ns/m ; 1.2 ns/ft
	Capacitance at 1 GHz	79.4 pF/m ; 24.2 pF/ft	80 pF/m ; 24.1 pF/ft	79 pF/m ; 23.9 pF/ft	78 pF/m ; 23.6 pF/ft	80 pF/m ; 24.1 pF/ft	79 pF/m ; 23.9 pF/ft
	Screening effectiveness at 18 GHz	>90 dB	>90 dB	>90 dB	>90 dB (at 9.5 GHz)	>90 dB	>90 dB
	Phase stability with bending	<1° / 360° / GHz	<0.4° / 360° / GHz	<0.4° / 360° / GHz	<0.6° / 360° / GHz	<0.4° / 360° / GHz	<0.4° / 360° / GHz
	Phase stability with temp.	<2°/m/GHz (-55 / +85°C)	<3.8°/m/GHz (-55 / +100°C)	<3.8°/m/GHz (-55 / +100°C)	-	<3,8°/m/GHz (-55 / +100°C)	<3,8°/m/GHz (-55 / +100°C)
	Attenuation stability with bending	<0.05 dB at 18 GHz <0.12 dB at 32 GHz	<0.05 dB at 18 GHz <0.1 dB at 26.5 GHz	<0.05 dB at 18 GHz	<0.05 dB at 18 GHz	<0.05 dB at 18 GHz <0.1 dB at 26.5 GHz	<0.05 dB at 18 GHz
	Att. variation with temp.	Att. (at X°C) = att.(at 20°C) x (1 + (X - 20) x 0.002)			Att. (at X°C) = att.(at 20°C) x (1 + (X - 20) x 0.002)		
Mechanical	Maximum weight	41 g/m ; 12.5 g/ft	44 g/m - 13.3 g/ft	92 g/m - 28.04 g/ft	280 g/m ; 84.8 g/ft	51 g/m - 15.4 g/ft	100 g/m - 30.48 g/ft
	Min. bend radius	25 mm ; 0.984 inch	25 mm - 0.984 inch	40 mm - 1.575 inch	60 mm ; 2.362 inches	25 mm - 0.984 inch	40 mm - 1.575 inch
	Crush resistance	> 200 N / 100 mm	> 200 N / 100 mm	> 200 N / 100 mm	> 600 N / 100 mm	> 400 N / 100 mm	> 400 N / 100 mm
Environmental	Operating temp. range (*)	-70 / +200° C -94 / +392° F	-70 / +200° C -94 / +392° F	-70 / +200° C -94 / +392° F	-70 / +200° C -94 / +392° F	-70 / +200° C -94 / +392° F	-70 / +200° C -94 / +392° F
	Flammability	JAR25/FAR25 853	JAR25/FAR25 853	JAR25/FAR25 853	JAR25/FAR25 853	JAR25/FAR25 853	JAR25/FAR25 853
	Halogen free jacket	No	No	No	No	No	No
	Fluid resistence	RTCADO 160 ; MIL DTL 87104	RTCADO 160 ; MIL DTL 87104	RTCADO 160 ; MIL DTL 87104	RTCADO 160 ; MIL DTL 87104	RTCADO 160 ; MIL DTL 87104	RTCADO 160 ; MIL DTL 87104
Frequency/Attenuation	1 (dB /m - dB /ft)	0.25 - 0.08	0.23 - 0.07	0.15 - 0.04	0.09 - 0.03	0.46 - 0.14	0.3 - 0.09
	2	0.36 - 0.11	0.32 - 0.1	0.21 - 0.06	0.14 - 0.04	0.57 - 0.17	0.37 - 0.11
	4	0.52 - 0.16	0.46 - 0.14	0.3 - 0.09	0.2 - 0.06	0.66 - 0.2	0.44 - 0.13
	6	0.65 - 0.2	0.57 - 0.17	0.37 - 0.11	0.26 - 0.08	0.84 - 0.26	0.55 - 0.17
	8	0.76 - 0.23	0.66 - 0.2	0.44 - 0.13	0.3 - 0.09	1.02 - 0.31	0.68 - 0.21
	12.4	0.98 - 0.3	0.84 - 0.26	0.55 - 0.17		1.27 - 0.39	0.85 - 0.26
	18	1.21 - 0.37	1.02 - 0.31	0.68 - 0.21		1.4 - 0.43	0.95 - 0.29
	26.5	1.51 - 0.46	1.27 - 0.39			1.59 - 0.49	
	32	1.69 - 0.51					
	40						
	Attenuation calculation (dB/m)	(0.242 x √F GHz) + (0.01 x F GHz)	(0.22 x √F GHz) + (0.005 x F GHz)	(0.14 x √F GHz) + (0.005 x F GHz)	(0.087 x √F GHz) + (0.007 x F GHz)	(0.22 x √F GHz) + (0.005 x F GHz)	(0.14 x √F GHz) + (0.005 x F GHz)

LightWeight and AirFrame Graphs

INSERTION LOSS



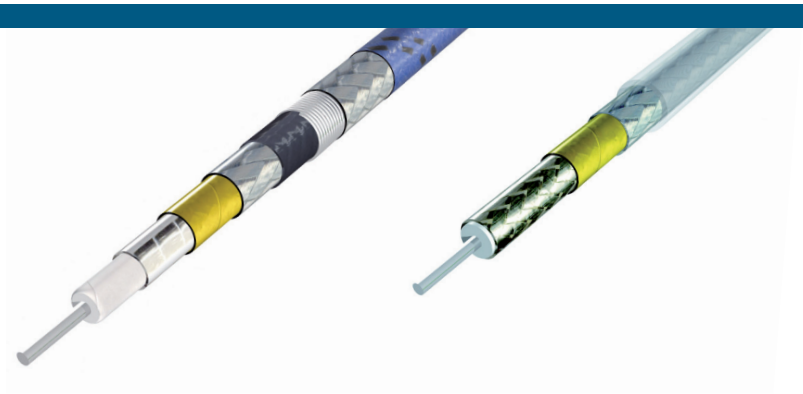
POWER HANDLING



Series	Gender	Type	SHF4.6M	SHF13	SHF5MAF-2	SHF8MAF-2	SHF5MLW-2	SHF8MLW-2
SMA	Plug	Straight			■	■	■	■
		Right-angle			■	■	■	■
	Jack	Straight Bulkhead			■	■	■	■
SMA2.9	Plug	Straight	■					
BMA	Plug	Straight					■	
		Straight Bulkhead					■	
	Jack	Straight					■	
TNC 18	Plug	Straight		■	■	■	■	■
		Right-angle				■	■	■
	Jack	Straight Bulkhead		■	■	■	■	■
N 18	Plug	Straight		■	■	■	■	■
		Right-angle				■	■	■
		Straight Bulkhead		■	■	■	■	■

SECTION 5

TestPro Reminder



TestPro

TestPro cables are dedicated to bench test cable assemblies. Our TestPro range differs from the SHF range, because the cables and connectors are designed for high performance, testing, and measurement.

Other products on the market, offer cosmetic solutions that only appear more robust without any real performance advantages, whereas Radiall offers a full range of test bench cables that performs better than any other product on the market.

Test cable assemblies are intended for daily use in component and assembly shops, test labs and automatic test equipment applications. They differ from standard cable assemblies in that they are specially designed for applications that require repeated connection/disconnection procedures, strenuous flexing situations and applications where cable and connector durability is important.

Key caracteristics of our Testpro range are:

- *Rugged interface: 5,000 mating/unmating lifecycle*
- *Flex life: over 20,000 cycles*
- *High flexibility*
- *Outstanding phase and loss stability for long calibration intervals*

	TestPro 4.2	TestPro 3	TestPro 2 (launch 2014)
Frequency range	DC - 18 GHz	DC - 26.5 GHz / DC- 40 GHz	DC – 50 GHz / DC – 67 GHz
Impedance	50 Ω ± 2 Ω	50 Ω ± 1 Ω	50 Ω ± 1 Ω
IL (dB/m)	2.10 @ 18 GHz	2.41 @ 26.5 GHz - 3.11 @ 40 GHz	5.00 @ 50 GHz – 5.92 @ 67 GHz
IL (dB/ft)	0.64 @ 18 GHz	0.73 @ 26.5 GHz - 0.94 @ 40 GHz	1.52 @ 50 GHz – 1.80 @ 67 GHz
Phase with flexure stability	2° @ 18 GHz	2° @ 26.5 GHz - 5° @ 40 GHz	6° @ 50 GHz - 8° @ 67 GHz
Amplitude stability (dB)	0.05 @ 18 GHz	0.05 @ 40 GHz	0.05 @ 50 GHz
Shielding Effectiveness	-110 dB min @ 1 GHz	-100 dB min @ 1 GHz	-100 dB min @ 1 GHz
Crush resistance	135 lb/linear in.	260 lb/linear in.	260 lb/linear in.
Minimum bend radius	25 mm (1 in.)	25 mm (1 in.)	25 mm (1 in.)
Temperature (°C)	-55 / + 125 °C	-55 / + 125 °C	-55 / + 125 °C
Connectors	SMA, N, TNC, PC7	SMA3.5, SMA2.9, NMD2.9, TVAC2.9, SMA2.4mm, N	2.4mm / 1.85 mm
Flexure life cycle	10,000	20,000	20,000
Mating cycles durability	5,000	5,000	5,000
Armor	Available	Integrated	Integrated
RoHS / REACH	Yes	Yes	Yes

*Please refer to Testpro catalog D1A295TE

SECTION 6

Special Cables and Harnesses

Special Cables

Radiall is qualified as a major supplier of microwave assemblies for Industrial applications, Ground and Navy Radars, and for commercial, military and space flight applications worldwide.

Radiall's ability to custom design products to meet our customers needs has grown through such applications. Radiall takes pride in engineering the correct product for all applications, no matter how difficult.

Radiall's dedicated design team can develop innovative solutions and products to meet the needs of customers.

Radiall is committed to providing the best RF lines of Ultra Low Loss Cables, by providing a large product range and custom fit designs to meet the needs of all customers.

Radiall offers customized cables to meet various constrains, such as:

- *Phase machting & tracking*
- *Time delay*
- *Low bending force*
- *Flex life*
- *High pressure*
- *Chemical aggression*

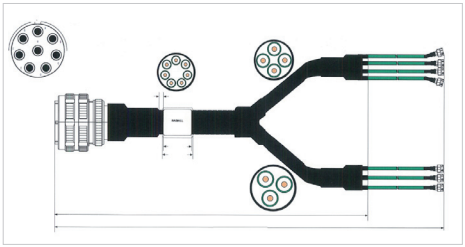
Harnesses

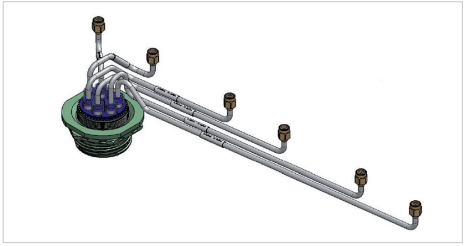
Design knowledge and manufacturing expertise of SHF cables and connectors (RF, multipin, optical) makes Radiall the specialist of custom harnesses. Based on customer specifications, Radiall is committed to designing innovative solutions that withstand environmental and mechanical stress factors, with excellent performance.

Among the many advantages that cable harnesses provide over loose wires is that is provides a more secure connection, and reduces the effects of vibrations, abrasions, and moisture.

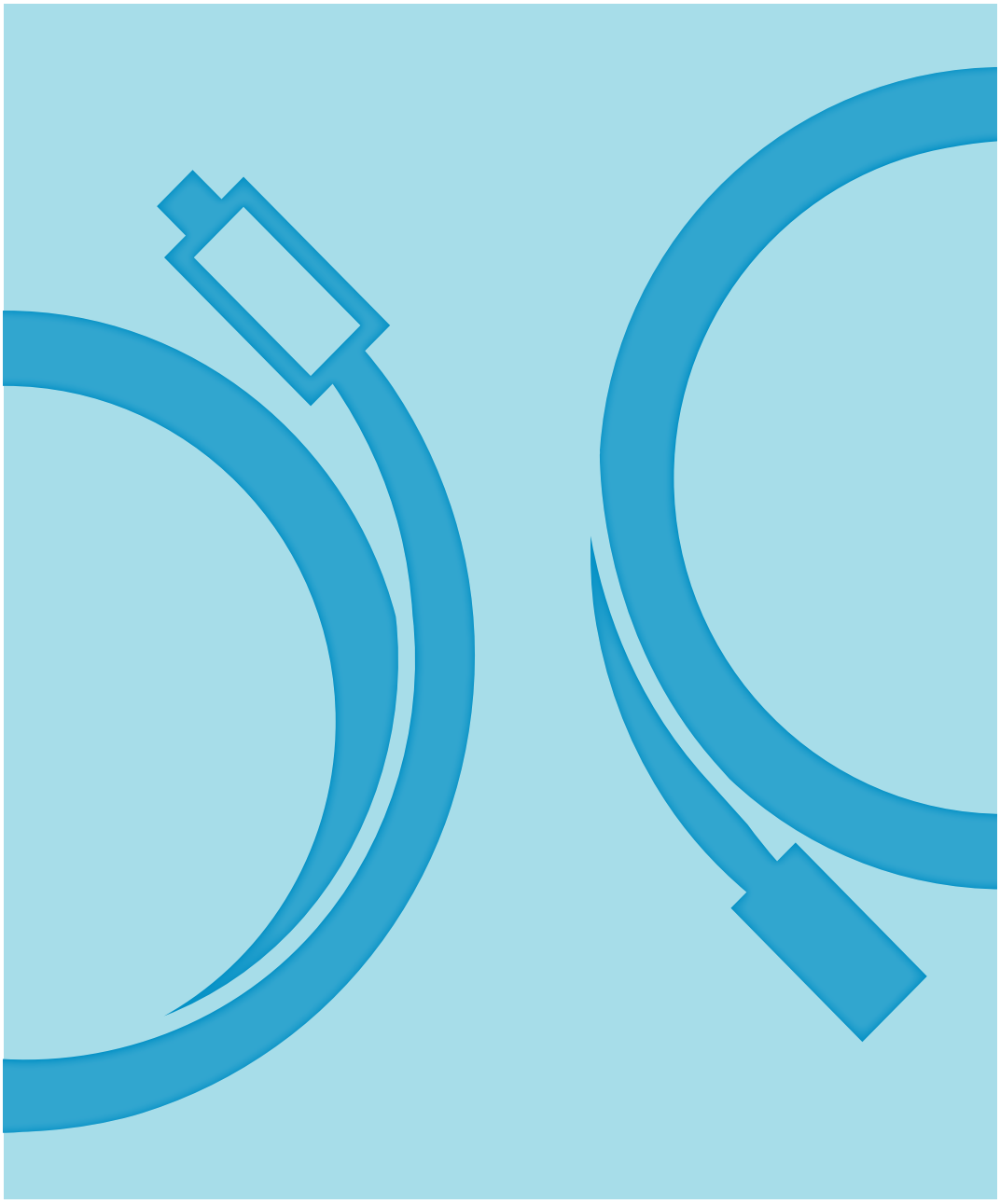
By binding the cables into a non-flexing bundle, the amount of space required is reduced, and the risk of a short circuit is decreased. Since the installer has only one harness to install (as opposed to multiple cables), installation time is decreased and the process can be easily standardized.

Taking into account these challenges, Radiall uses the best connectors from 38999 series, optical (LuxCis®) and multipin connectors (EPX®, DSX, NSX, ARINC...) to meet customers needs.





BMA #8 for Series	Gender	SHF2.4M	SHF3	SHF3M	SHF4.2M	SHF5	SHF5M	SHF5MR
MIL DTL 38999	Pin coax	■	■	■	■	■	■	■
	Socket coax	■	■	■	■	■	■	■
NSX (ARINC 600)	Pin coax	■			■	■	■	■
	Socket coax		■	■		■	■	■
MPX	Pin coax					■	■	■
	Socket coax		■	■		■	■	■
EPXB	Pin coax	■				■	■	■
	Socket coax		■	■		■	■	■

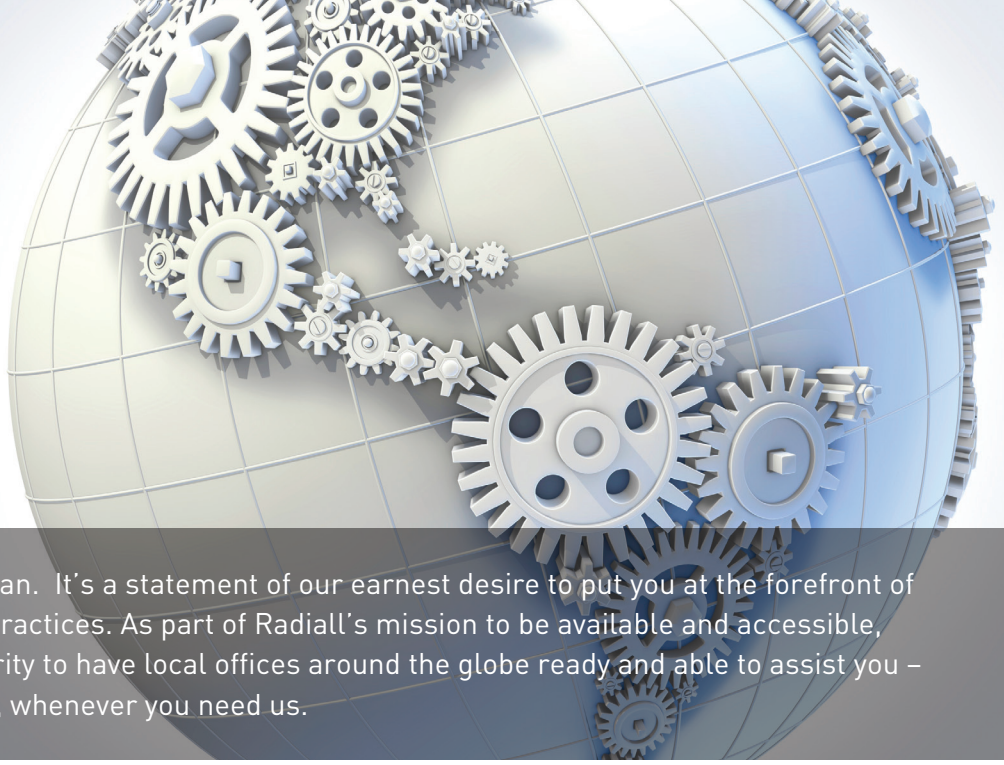


Part Number Index

SHF Cable Assemblies

Part Number Index

area offices
local contacts



Our most important connection is with you.™

It's not just a slogan. It's a statement of our earnest desire to put you at the forefront of all our business practices. As part of Radiall's mission to be available and accessible, we make it a priority to have local offices around the globe ready and able to assist you – wherever you are, whenever you need us.

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