



**射频电缆产品**  
**RF CABLE**  
**CATALOGUE**





- GJB9001 and other Military industry qualification  
军工质量体系等  
军工相关资质

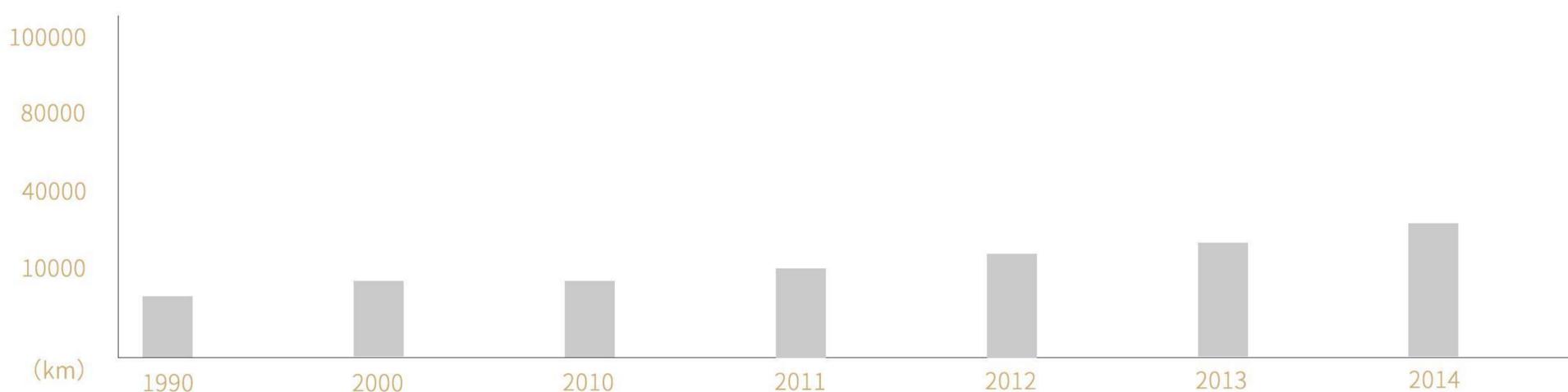
- ISO9001  
质量认证体系

- Shanghai high tech Enterprises  
上海高新技术企业

- More than 126 patents  
126余项新型专利/发明专利

- The annual production is more than 100000KM  
年产各类电缆十万余公里

1990	2012	2013
<p>正式成立了公司的前身“上海创新高温电缆厂”。</p> <p>The company's predecessor "Shanghai Innovation High Temperature Cable Factory" was formally established.</p>	<p>成立了上海昕讯微波科技有限公司，以区分业务运营。</p> <p>Shanghai Xinxun Microwave Technology Co., Ltd. was established to distinguish business operations.</p>	<p>与哈尔滨工业大学电气绝缘与电缆专业联合成立了微波实验室。</p> <p>Joint Microwave Laboratory with Electrical Insulation and Cable Specialty of Harbin Institute of Technology.</p>



■ 上海“专精特新”技术企业

■ Jiangsu high tech Enterprises  
江苏高新技术企业



2017

2018

2019

通过ISO9001和GJB9001质量体系认证。微波无源器件业务成功发展。

Pass ISO9001 and GJB9001 quality system certification. Successful development of microwave device business.

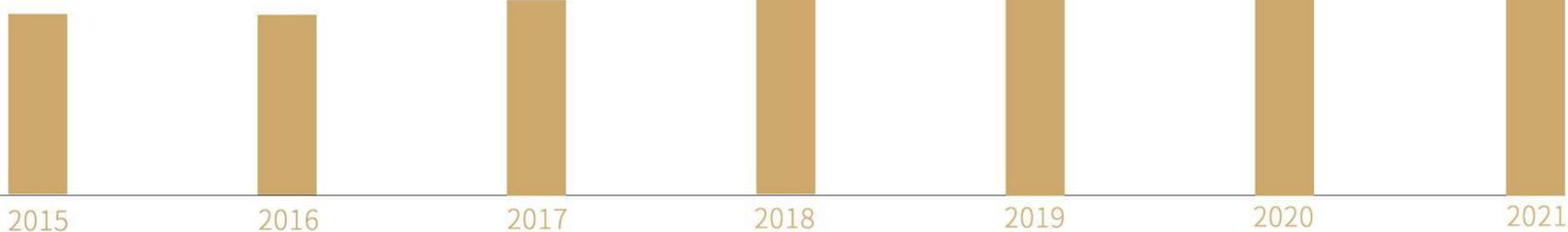
企业被评为“上海市高新技术企业”、“上海市专精特新技术企业”。

The enterprise was rated as "Shanghai High-tech Enterprise".

成立全资子公司“江苏昕讯光电科技有限公司”并且取得相关军工资质，于南通建立了厂区。

Established a wholly-owned subsidiary "Jiangsu Xinxun Cable Technology Co., Ltd." and obtained the relevant military qualification, built Nantong Plant Area

XINXUN



2015 2016 2017 2018 2019 2020 2021



# 昕讯微波简介

## About us

根据不同客户的特殊要求，组织生产满足不同客户要求的合格产品。在生产方面，我公司拥有先进的技术力量与设备、完善的测试手段、现代化的生产管控、严格的工艺要求，确保了产品的质量。年生产各类电缆十万余公里，微波无源器件 1 万余件。因此深受国内外广大客户的赞许。

According to the special requirements of different customers, organize the production of qualified products to meet the requirements of different customers. In production, our company has advanced technical force and equipment, perfect testing means, modern production control, strict process requirements, to ensure the quality of products. Annual production of various types of cable more than 100000 kilometers, microwave passive components more than 10000 pieces. Therefore, it is highly praised by customers at home and abroad.



上海昕讯微波有限公司，是一家专业生产中高端同轴射频电缆、特种电缆及射频微波器件的企业，我司专业从事低损耗稳相射频电缆、RF 电缆、核电用信号通信电缆、特种电缆、同轴射频连接器、电缆组件及射频无源器件。产品特殊且专业性很强，在部分地区与领域具有较高知名度。在低损耗稳相电缆领域多款产品通过认证鉴定并获得 126 项专利，达到世界先进水平。

Shanghai Xinxun microwave Co., Ltd. is an enterprise specializing in the production of medium and high-end coaxial RF cables, special cables and RF microwave devices. Our company specializes in low loss stable phase RF cables, RF cables, nuclear power signal communication cables, special cables, coaxial RF connectors, cable components and RF passive components. The products are special and professional, and have a high reputation in some regions and fields. In the field of low loss stable phase cable, many products have passed certification and obtained 126 patents, reaching the world advanced level.

## 昕讯微波测试中心

Our test center

公司建有独立的测试中心，测试中心达到500平方米，其中拥有功率容量测试系统、矢量网络分析仪20台（测试频率最高至110G）、高低温交变试验箱6台、温度冲击试验箱3台、TDR阻抗仪2台、二次元影像显微镜5台、ROHS测试仪等各种先进测试仪器共计300余台，可对同轴射频电缆、无源器件、电缆组件、耐高温电缆进行全面的电性能测试和环境测试，满足不同客户对产品性能的测试要求。

Our company has an independent test center, the test center reaches 500 square meters, It has more than 300 advanced test instruments, such as power capacity test system, 10 vector network analyzers (test frequency up to 110G), 5 high-low temperature alternating test chambers, 2 temperature shock test chambers, 2 TDR impedance meters, 2 second-order image microscopes, and RoHS tester. It can carry out comprehensive electrical performance test and environmental test on coaxial RF cables, passive components, cable assemblies and high-temperature resistant cables to meet the test requirements of different customers on product performance.

# 500m<sup>2</sup>

# 110GHz

# XINXUN



# Experimental equipment



公司测试中心不仅能满足公司内部产品的测试需求，同时还参与各种外部产品的委外测试，2013年初与哈尔滨理工大学电气学院电气绝缘与电缆专业成立了联合微波实验室，并定期与学院方面组织技术交流与探讨。在测试方面，公司拥有专业的测试团队与测量设备，模拟不同客户产品在终端使用的状态，以完善的测试手段保障产品的质量，不断给客户提供高性能高需求度的合格产品。

Our test center of the company can not only meet the testing needs of the company's internal products, but also participate in the outsourcing testing of various external products. In early 2013, the company set up a joint microwave laboratory with the electrical insulation and cable major of Harbin University of Science and Technology, and regularly organized technical exchanges and discussions with the school. In terms of testing, Our company has a professional testing team and measuring equipment to simulate the state of different customers' products in terminal use, so as to ensure the quality of products by perfect testing means, and continue to provide customers with qualified products with high performance and high demand.

# 昕讯射频电缆命名方法

1	X-代表昕讯电缆的缩写
2	绝缘材料   F-氟塑料 Y-PE T-特殊材料
3	电缆特性与外导体结构   WP- 发泡低损稳相 (发泡介质 + 铜带绕包 + 圆线编织) XP- 发泡低损稳相 (整体发泡介质 + 铜带绕包 + 圆线编织) HP- 大功率系列 BP- 发泡低损 (扁线编织 + 圆线编织) X - 普通绝缘低损 (铜带绕包 + 圆线编织) BX- 普通绝缘低损 (扁线编织 + 圆线编织) S - 束丝外导体 (圆线或扁线束丝) M- 常规结构 (铝箔 + 圆线编织或圆线编织)
4	电缆阻抗   50-50Ω (可省略) 如有特殊阻抗需标注
5	电缆直径   英寸 ×1000
6	护套   F-F46 FA-PFA J-聚氨酯 L-低烟无卤聚烯烃 V-PVC Y-PE G-硅橡胶
7	颜色   可省略 (按我司标准色) 如有特殊需求需要标注 B-黑色 BL-蓝色 BR-棕色 G-灰 GR-绿 R-红色 Y-黄色
8	特殊备注   Q-轻型 D-多芯内导体 R-超柔等级 L-经济型

注：例如：1. 低损稳相电缆国外类似型号：UFB-311, 我司命名方法为：XFWP-311

2. 普通绝缘低损电缆国外类似型号：T-flex 402, 我司命名方法为：XFX-141

3. 半钢电缆国外类似型号：UT-142, 我司命名方法为：XFT-142

注：普通常规电缆按国家标准命名：如：SFCJ-50-3；SFX-50-3；SFF-12.5-0.6；SFT-50-3等

# Naming method

1	X- Abbreviation for cable	
2	Insulating material	F-Fluoroplastics    Y-PE    T-Special materials
3	Cable characteristics and outer conductor structure	WP – Foaming low loss stable phase (foaming medium +copper tape wrapping + round wire weaving) XP – Foaming low loss stable phase (integral foaming medium + copper tape wrapping + round wire weaving) HP – High power series BP – Foaming and low loss (flat knitting + round knitting) X – Low loss of common insulation (copper tape wrapping + round wire braiding) BX – Low loss of common insulation (flat wire braiding + round wire braiding) S – Bundle wire outer conductor (round wire or flat bundle wire) M – Conventional construction (aluminum foil + round or round)
4	Cable impedance	50–50Ω ( Can be omitte) If any special impedance, it should be noted
5	Cable diameter	inch×1000
6	sheath	F – F46    FA – PFA    J – polyurethane L – Low smoke halogen free polyolefin V – PVC    Y – PE    G – silicon rubber
7	colour	It can be omitted (according to our standard color) if there is special needs to be marked B-black    BL-blue    BR-brown G-gray    GR-green    R-red    Y-yellow
8	Special remarks	Q-light    D–Multicore inner conductor R–Ultra soft    L–Economic type

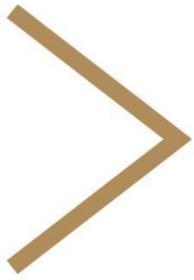
P.S : For example : 1.Similar type of low loss stable phase cable abroad : UFB-311,  
 Our naming method is : XFWP-311  
 2. Similar models of ordinary insulated low loss cables abroad :  
 T-flex 402 ,Our naming method is : XFX-141  
 3.Similar model of semi steel cable : UT-142,Our naming method is : XFT-142  
 P.S : Common cables are named according to national standards : as : SFCJ-50-3 ;  
 SFX-50-3 ; SFF-12.5-0.6 ; SFT-50-3etc.

## 产品型号对比表

我司型号 Cable type of our products	可替代产品 厂家及型号 Exchangeable type	阻抗 (Ω) Impedance	工作频率 (GHz) Working frequency	插损(dB/m) Insertion loss		
				1GHz	10GHz	18GHz
XFWP-90	GORE CXN3506	50	67	0.63	2.00	2.72
XFWP-142	GORE CXN3507	50	40	0.36	1.10	1.58
XFWP-190	GORE CXN3449	50	26.5	0.26	0.81	1.08
XFWP-205	MICRO-COAX UFB-205A	50	26.5	0.25	0.92	1.05
XFWP-290	GORE CXN3450	50	18	0.20	0.50	0.68
XFWP-311	MICRO-COAX UFB-311A	50	18	0.16	0.47	0.63
XFWP-320	GORE CXN3508	50	18	0.13	0.45	0.61
XFX-086	TIMES T-flex 405	50	18	0.69	2.46	3.48
XFX-141	TIMES T-flex 402	50	40	0.47	1.65	2.13
XFXP-150	CARLISLE 1130A	50	40	0.40	1.27	1.69
XFXP-155B	H+S SF102E	50	40	0.39	1.26	1.73
XFXP-216	H+S SF104E	50	26.5	0.25	0.72	1.10
XFHP-450	Semflex HP450	50	12	0.14	0.50	----
SFCJ-50-3	中电科23所 同款	50	18	0.44	1.50	2.09
XFHP-450	中电科23所 同款	50	12	0.14	0.50	----
SFCJ-50-5	中电科 23所同款	50	18	0.34	1.05	1.50
SFCJ-50-7	中电科 23所同款	50	15	0.18	0.72	----
SFCJ-50-9	中电科 23所同款	50	10	0.17	0.66	----

## Comparison table of product models

电缆外径 (mm) Outer diameter	温度范围 (°C) Operating temperature range	温度相位稳定性 (PPM) (-40°C~+85°C) Phase stability vs temperature
2.30	-65~+165	≤800PPM (-55°C~+85°C)
3.60	-65~+165	≤750PPM (-55°C~+85°C)
4.80	-65~+165	≤750PPM (-55°C~+85°C)
5.21	-65~+165	≤750PPM (-55°C~+85°C)
7.50	-65~+165	≤750PPM (-55°C~+85°C)
7.90	-65~+165	≤750PPM (-55°C~+85°C)
8.10	-65~+165	≤750PPM (-55°C~+85°C)
2.64	-65~+165	
4.06	-65~+165	
3.80	-65~+165	
5.30	-65~+90	
5.50	-65~+165	
11.43	-65~+165	
5.00	-55~+85	
11.43	-65~+165	
7.30	55~+85	
10.50	55~+85	
13.30	55~+85	



# Contents

## 目录

### 高性能柔性低损耗同轴射频电缆

High performance, flexibility and low loss coaxial RF cable

▪ XFWP series	03
▪ SP XFWP series	09
▪ XFXP series	15
▪ XFX series	21

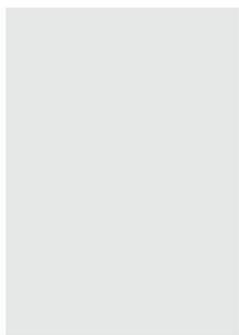
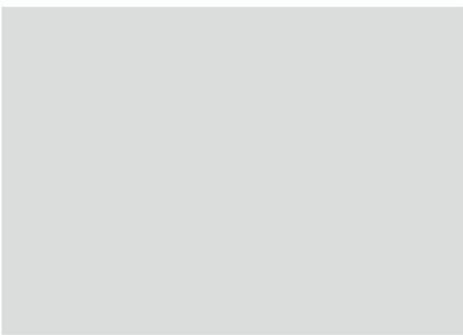
### 柔性低损耗同轴射频电缆

Flexible low loss coaxial RF cable

▪ XFBP series	27
▪ SFCJ series	33
▪ XYMR series	37
▪ XFLL series	41



技术支持	57
Technical support	



# 航空航天用超轻 柔性低损耗电缆

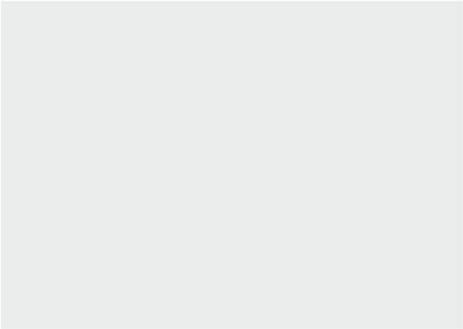
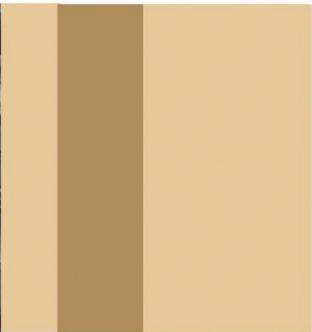
Ultra flexible low loss  
for Aerospace

▪ XFWQ series 45

# STF系列电缆

SFT series cable

▪ SFT series 53  
▪ SFT-LP series 55



# 01

## 高性能柔性 低损耗同轴 射频电缆

High performance  
flexibility and low  
loss coaxial RF cable

01-24





系列电缆采用了特殊的结构与先进的生产工艺，使得电缆在全频段范围内有着优良的电气与机械性能指标,并具有很高的性价比。

Series cable adopts special structure design and advanced production technology, which makes the cable have excellent electrical and mechanical performance index in the full frequency range, and it also cost effective.

- 
- XFWP series
  - XFXP series
  - XFX series
  - Special WP series

## 产品介绍

### Product introduction

XFWP系列高性能柔性低损耗同轴射频电缆采用了特殊的结构与先进的生产工艺，使得电缆在全频段范围内有着优良的电气与机械性能指标。

电气性能方面，信号传输速率高达83%，温度相位稳定性小于850PPM，还具有损耗低，屏蔽效率高、使用寿命长等特点。

机械性能方面，微孔低密度PTFE绝缘和镀银铜扁带绕包，使得电缆有更好的弯曲性和较长的机械相位稳定性，但在电缆使用过程中应注意防止过度扭曲而损坏电缆外导体结构，从而影响产品性能。

耐环境性方面，该电缆采用耐环境性能优越的FEP、PFA等原材料，使其具有使用温度范围宽、抗腐蚀性、防霉防潮、阻燃等特点。

XFWP series High performance flexible low loss Radio Frequency Coaxial Cable adopt the special structure design and advanced production technology, make cable in the whole frequency range has excellent electrical and mechanical performance index.

Electrical performance :The Velocity of Propagation can up to 83%;Temperature Phase Stable is less than 850PPM. Also has low dissipation, shielding efficiency higher characteristic.

Mechanical properties, Microporous low density PTFE insulation and silver plating copper strip wrapped, making the cable have better flexibility and long mechanical phase stability, but in cable use process should pay attention to prevent excessive distortion and damaged cable outer conductor structure, thus affecting the product performance.

Environmental performance, the cable is made of FEP, PFA and other raw materials with superior environmental resistance, make its have use temperature scope wide, corrosion resistance, mouldproof moistureproof, flame retardant characteristics.

XFWP Series

高性能柔性低损耗同轴射频电缆  
High performance flexible low loss coaxial RF cable

# XFWP

## 结构说明

### Construction Instruction

1.内导体：采用单芯镀银线。在相同外径的情况下单芯内导体有更低的损耗，在弯曲情况下有更好的机械相位稳定性。

2.绝缘：采用微孔低密度PTFE，介电常数1.45左右，多层绕包结构能使电缆外径和绝缘介电常数稳定，保障了信号的稳定传输。

3.屏蔽层：采用双屏蔽层结构，内屏蔽层采用镀银铜带绕包，外屏蔽层采用镀银铜线编织。镀银铜带绕包使电缆的损耗降低，屏蔽效率增加，高密度编织层是电缆的抗拉强度增加。

4.护套：采用了环境适应性能优越的FEP或PFA等原材料，使电缆具有较高的环境适应性。

1.Inner Conductor: Single core silver plated wire. In the same order of outer diameter core inner conductor has lower loss, in bending cases have better mechanical phase stability.

2.Insulator: Adopt microporous low density PTFE, dielectric constant 1.45, multilayer wrapped structure can make the cable diameter and insulating dielectric constant stability, safeguard the stability of the signal transmission.

3.Shielding: With double shielding layer structure, the shielding layer using silver plating copper strap bag, the shielding layer using silver plated copper wire braided. Silver plating copper tape around the bag to make cable loss is reduced, shielding efficiency increase, high density braid is cable tensile strength increased.

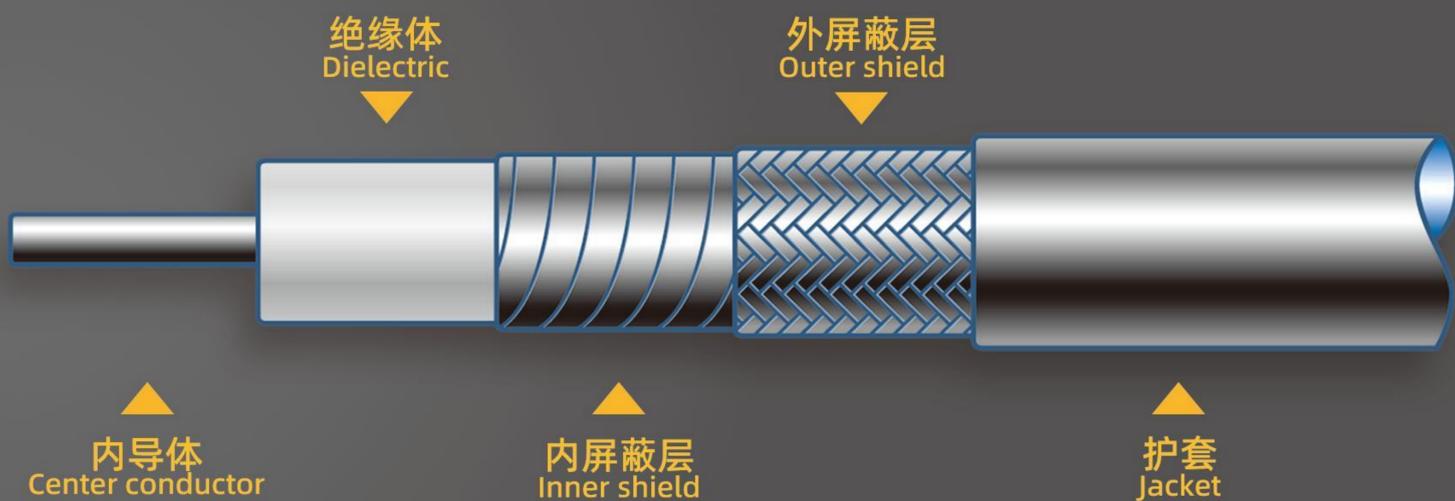
4.Jacket: Raw materials such as FEP or PFA with superior environmental adaptability are used, cable has high environmental adaptability.

## 应用领域

### Application Field

适用于对相位一致性有较高要求的整机系统，如：预警、制导、战术雷达和信息通信、电子对抗及遥感、卫星通信、微波测试等系统。

Application for the whole system with high requirements for phase consistency, such as early warning, guidance, tactical radar and information communication, electronic countermeasures and remote sensing, satellite communication, microwave test and so on.



XFWP Series

## 结构参数与机械性能

### Structural parameters and mechanical properties

型号 Type	XFWP-060	XFWP-90	XFWP-125	XFWP-142	XFWP-143A	XFWP-190
内导体外径 (mm) Center Conductor	0.32	0.51	0.72	0.91	1.02	1.40
导体形式 Center Conductor Type	单芯 Solid	单芯 Solid	单芯 Solid	单芯 Solid	单芯 Solid	单芯 Solid
绝缘外径 (mm) Insulation Diameter	0.88	1.40	2.00	2.50	2.79	3.85
外导体外径 (mm) Shields Diameter	1.30	1.90	2.60	3.10	3.30	4.40
总外径(mm) Jacket Diameter	≤1.60	≤2.30	≤3.20	≤3.60	≤3.75	≤4.85
最小弯曲半径(mm) Min.bending radius	8	11	16	18	18	26

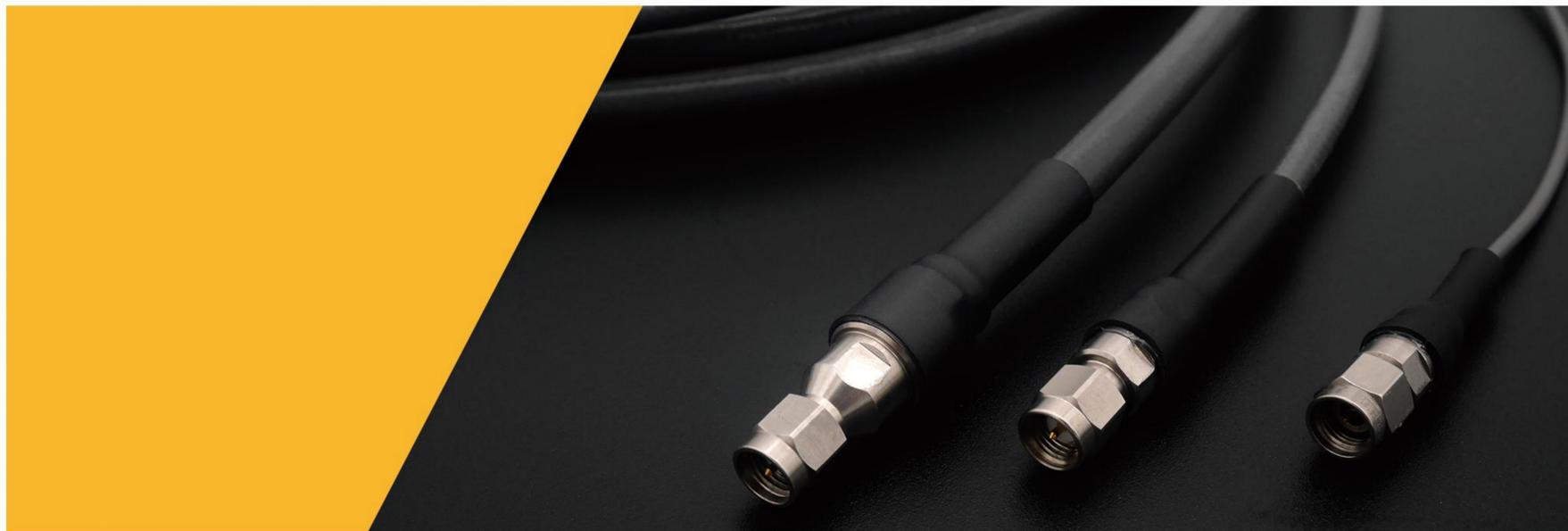
# 电气与环境性能

## Electrical and Environmental Performance

型号 Type	XFWP-060	XFWP-90	XFWP-125	XFWP-142	XFWP-143A	XFWP-190
特性阻抗(ohms) Impedance	50	50	50	50	50	50
电容(pf/m) Capacitance	88	85	83	83	83	83
工作频率(GHz) Frequency Range	DC-110	DC-67	DC-50	DC-40	DC-40	DC-26.5
传输速率 Velocity of Propagation	79%	80%	82%	82%	82%	83%
最大工作电压 (kV) Max.Operating Voltage	0.4	0.8	1.0	1.2	1.2	1.3
屏蔽效率 (dB@1GHz) Shielding Effectiveness	≥90	≥90	≥90	≥90	≥90	≥90
损耗 功率 Loss power	dB/m kW	dB/m kW	dB/m kW	dB/m kW	dB/m kW	dB/m kW
0.5GHz	0.71 0.071	0.44 0.136	0.31 0.581	0.26 0.708	0.22 0.959	0.19 1.316
1GHz	1.02 0.050	0.63 0.096	0.44 0.408	0.36 0.499	0.32 0.675	0.26 0.925
3GHz	1.81 0.028	1.10 0.055	0.78 0.232	0.61 0.285	0.55 0.386	0.44 0.526
6GHz	2.62 0.020	1.58 0.038	1.13 0.161	0.86 0.200	0.79 0.270	0.63 0.367
8GHz	3.06 0.017	1.84 0.033	1.32 0.138	0.99 0.172	0.92 0.232	0.73 0.315
10GHz	3.46 0.015	2.07 0.029	1.48 0.123	1.10 0.154	1.04 0.207	0.81 0.280
15GHz	4.33 0.012	2.57 0.024	1.85 0.099	1.36 0.124	1.28 0.167	0.99 0.226
18GHz	4.80 0.011	2.84 0.022	2.05 0.090	1.58 0.113	1.41 0.152	1.08 0.204
26.5GHz	5.98 0.008	3.50 0.018	2.54 0.072	2.09 0.092	1.74 0.124	1.35 0.166
40GHz	7.61 0.007	4.39 0.014	3.21 0.058	2.64 0.074	2.18 0.099	- -
50GHz	8.69 0.006	4.97 0.012	3.66 0.051	- -	- -	- -
67GHz	10.37 0.005	5.87 0.011	- -	- -	- -	- -
90GHz	12.45 0.004	- -	- -	- -	- -	- -
110GHz	14.13 0.003	- -	- -	- -	- -	- -
机械相位稳定性 (18GHz) Phase Stability vs Flexure (最小弯曲半径缠绕一圈)	±0.3°/GHz	±0.3°/GHz	±0.4°/GHz	±0.4°/GHz	±0.4°/GHz	±0.4°/GHz
相位温度稳定性 (ppm) -55°C~+85°C Phase Change vs	≤850ppm	≤800ppm	≤750ppm	≤750ppm	≤750ppm	≤750ppm
使用温度范围 (°C) Temperature Range	-65~+165	-65~+165	-65~+165	-65~+165	-65~+165	-65~+165

损耗 (+25°C室温)和功率 (+40°C室温, 海平面, 驻波1:1)

Insertion Loss (+25°C Ambient temperature) and Power (+40°C Ambient Temperature, Sea Level, VSWR1:1)



## 结构参数与机械性能

### Structural parameters and mechanical properties

型号 Type	XFWP-205	XFWP-220	XFWP-290	XFWP-311	XFWP-320	XFWP-400	XFWP-480
内导体外径 (mm) Center Conductor	1.45	1.60	2.10	2.30	2.40	3.00	3.80
导体形式 Center Conductor Type	单芯 Solid						
绝缘外径 (mm) Insulation Diameter	3.90	4.40	5.80	6.30	6.60	8.10	10.10
外导体外径 (mm) Shields Diameter	4.59	5.10	6.65	7.10	7.50	9.10	11.10
总外径(mm) Jacket Diameter	≤5.20	≤5.80	≤7.50	≤7.90	≤8.10	≤10.20	≤12.20
最小弯曲半径(mm) Min.bending radius	26	30	37	40	40	50	60

## 电气与环境性能

### Electrical and Environmental Performance

型号 Type	XFWP-205	XFWP-220	XFWP-290	XFWP-311	XFWP-320	XFWP-400	XFWP-480
特性阻抗(ohms) Impedance	50	50	50	50	50	50	50
电容(pf/m) Capacitance	83	83	83	83	83	83	83
工作频率(GHz) Frequency Range	DC-26.5	DC-18	DC-18	DC-18	DC-18	DC-12	DC-8
传输速率 Velocity of Propagation	83%	83%	83%	83%	83%	83%	84%
最大工作电压 (kV) Max.Operating Voltage	1.5	2.0	3.0	3.0	3.0	4.0	5.0
屏蔽效率 (dB@1GHz) Shielding Effectiveness	≥90	≥90	≥90	≥90	≥90	≥90	≥90

# 电气与环境性能

## Electrical and Environmental Performance

型号 Type	XFWP-205		XFWP-220		XFWP-290		XFWP-311		XFWP-320		XFWP-400		XFWP-480		
损耗 Loss	功率 power	dB/m	kW	dB/m	kW										
0.5GHz		0.18	1.390	0.14	1.589	0.16	2.487	0.12	2.577	0.11	2.712	0.09	3.313	0.07	3.313
1GHz		0.24	0.977	0.20	1.116	0.21	1.750	0.17	1.812	0.14	1.906	0.13	2.324	0.10	2.324
3GHz		0.42	0.556	0.36	0.634	0.32	1.000	0.28	1.033	0.25	1.084	0.22	1.317	0.18	1.317
4GHz		0.48	0.479	0.41	0.546	0.36	0.863	0.33	0.890	0.28	0.934	0.26	1.132	0.21	1.132
6GHz		0.59	0.388	0.51	0.442	0.40	0.700	0.38	0.721	0.35	0.756	0.32	0.914	0.27	0.914
8GHz		0.68	0.333	0.60	0.379	0.46	0.603	0.44	0.621	0.41	0.649	0.37	0.784	0.31	0.784
10GHz		0.77	0.296	0.68	0.337	0.52	0.537	0.50	0.552	0.46	0.577	0.42	-	-	-
12GHz		0.84	0.269	0.75	0.306	0.57	0.488	0.55	0.501	0.50	0.524	0.47	-	-	-
15GHz		0.95	0.239	0.84	0.271	0.65	0.434	0.62	0.445	0.57	0.465	-	-	-	-
18GHz		1.05	0.216	0.93	0.246	0.71	0.394	0.67	0.404	0.63	0.421	-	-	-	-
26.5GHz		1.29	0.175	-	-	-	-	-	-	-	-	-	-	-	-
机械相位稳定性 (18GHz) Phase Stability vs Flexure (最小弯曲半径缠绕一圈)		±0.4°/GHz		±0.4°/GHz		±0.4°/GHz		±0.4°/GHz		±0.4°/GHz		±0.5°/GHz		±0.5°/GHz	
相位温度稳定性 (ppm) -55°C~+85°C Phase Change vs		≤750ppm		≤750ppm		≤750ppm		≤750ppm		≤750ppm		≤750ppm		≤750ppm	
使用温度范围 (°C) Temperature Range		-65~+165		-65~+165		-65~+165		-65~+165		-65~+165		-65~+165		-65~+165	

损耗 (+25°C室温)和功率 (+40°C室温, 海平面, 驻波1:1)

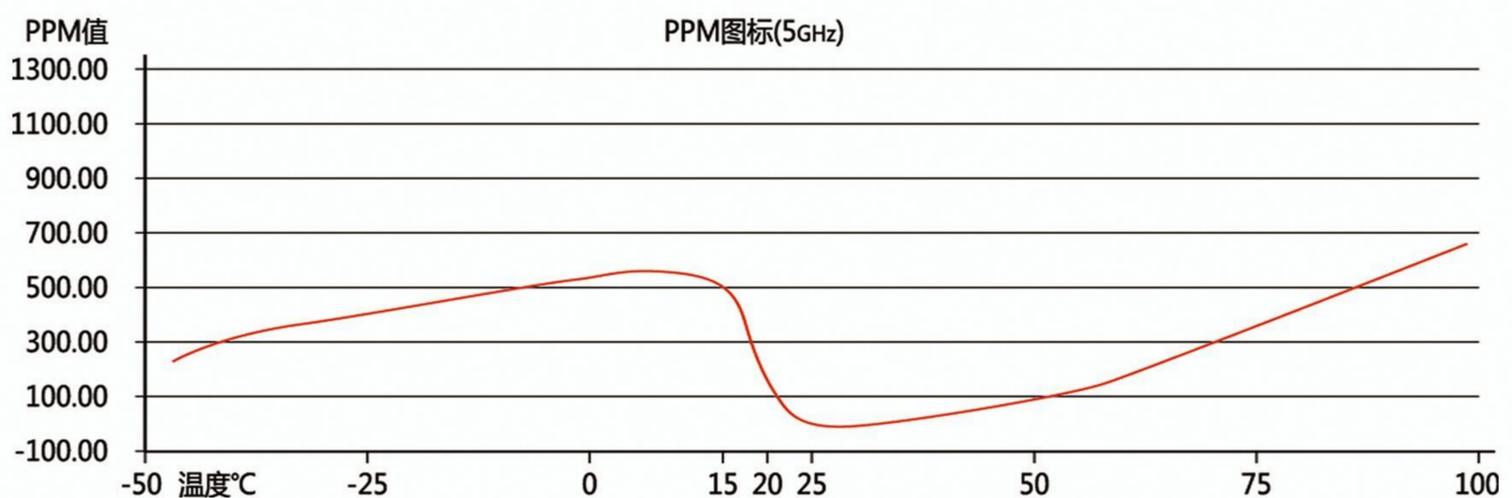
Insertion Loss (+25°C Ambient temperature) and Power (+40°C Ambient Temperature, Sea Level, VSWR1:1)

备注: 1.上表所列损耗值为未含连接器标称值, 连接器按 $2 \times 0.03 \sqrt{f(\text{GHz})}$ 计算。

2.机械相位稳定性与测试方法密切相关, 如用其他方法测试, 数值可能发生变化。

1.The loss shown does not include the connector, the connector according to  $2 \times 0.03 \sqrt{f(\text{GHz})}$  calculation.

2.Is closely related to the phase stability and mechanical testing methods, such as test with other methods, numerical might change.





## 产品介绍

### Product introduction

XFWP系列特种低损耗同轴射频电缆采用了特殊的结构与先进的生产工艺，使得电缆在全频段范围内有着优良的电气与机械性能指标。

电气性能方面，信号传输速率高达83%，温度相位稳定性小于850PPM，还具有损耗低，屏蔽效率高等特点。

机械性能方面，微孔低密度PTFE绝缘和镀银铜扁带绕包，使得电缆有更好的弯曲性和较长的机械相位稳定性，在内屏蔽与外屏蔽之间增加了氟塑料中间层，能有效解决电缆内部应力释放问题，使电缆稳定性更好，使用寿命更长，可以广泛应用于精密测量领域。

耐环境性方面，该电缆采用耐环境性能优越的FEP、PFA等原材料，使其具有使用温度范围宽、抗腐蚀性、防霉防潮、阻燃等特点。

XFWP series special low loss Radio Frequency Coaxial Cable adopt the special structure design and advanced production technology, make cable in the whole frequency range has excellent electrical and mechanical performance index.

Electrical performance :The Velocity of Propagation can up to 83%;Temperature Phase Stable is less than 850PPM. Also has low dissipation, shielding efficiency higher characteristic.

Mechanical properties, Microporous low density PTFE insulation and silver plating copper strip wrapped, making the cable have better flexibility and long mechanical phase stability, fluorine plastic intermediate layer is added between the inner shield and the outer shield, which can effectively solve the problem of internal stress release, make the cable stability better, longer service life, and can be widely used in the field of precision measurement.

Environmental performance, the cable is made of FEP, PFA and other raw materials with superior environmental resistance, make its have use temperature scope wide, corrosion resistance, mouldproof moistureproof, flame retardant characteristics.

XFWP Series

## 特种高性能低损耗同轴射频电缆

Special High performance low loss coaxial RF cable

# XFWP

## 结构说明

### Construction Instruction

1.内导体：采用单芯或绞合镀银线。在相同外径的情况下单芯内导体有更低的损耗，在弯曲情况下有更好的机械相位稳定性；绞合导体较为柔软，有更好的弯曲性和弯曲疲劳使用寿命。

2.绝缘：采用微孔低密度PTFE，介电常数1.45左右，多层绕包结构能使电缆外径和绝缘介电常数稳定，保障了信号的稳定传输。

3.屏蔽层：采用双屏蔽层+中间层结构，内屏蔽层采用镀银铜带绕包，外屏蔽层采用镀银铜线编织，内屏蔽与外屏蔽之间采用氟塑料中间层。镀银铜带绕包使电缆的损耗降低，屏蔽效率增加，高密度编织层是电缆的抗拉强度增加，氟塑料中间层使电缆稳定性更高，使用寿命增加。

4.护套：采用了环境适应性能优越的FEP或PFA等原材料，使电缆具有较高的环境适应性。

1.Inner Conductor: The single core or twisted plating silver thread. In the same order of outer diameter core inner conductor has lower loss, in bending cases have better mechanical phase stability; Stranded conductor is relatively soft, have better bending resistance and bending fatigue life.

2.Insulator: Adopt microporous low density PTFE, dielectric constant 1.45, multilayer wrapped structure can make the cable diameter and insulating dielectric constant stability, safeguard the stability of the signal transmission.

3.Shielding: Adopt double shield layer + intermediate layer structure, the shielding layer using silver plating copper strap bag, the shielding layer using silver plated copper wire braided, fluorine plastic intermediate layer is used between the inner shield and the outer shield. The silver-plated copper tape is wrapped to reduce the loss of the cable and increase the shielding efficiency. The high-density braided layer increases the tensile strength of the cable. The fluorine plastic intermediate layer makes the cable more stable and increases the service life.

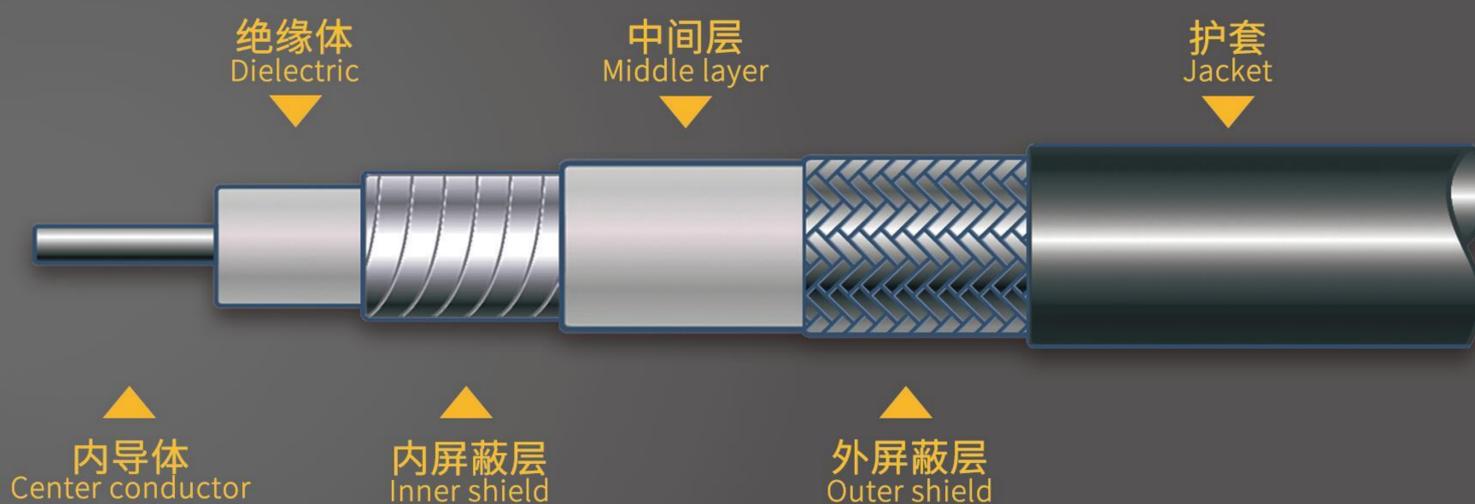
4.Jacket: Raw materials such as FEP or PFA with superior environmental adaptability are used, cable has high environmental adaptability.

## 应用领域

### Application Field

适用于对相位一致性有较高要求的整机系统，如：预警、制导、战术雷达和信息通信、电子对抗及遥感、卫星通信、微波测试等系统。

Application for the whole system with high requirements for phase consistency, such as early warning, guidance, tactical radar and information communication, electronic countermeasures and remote sensing, satellite communication, microwave test and so on.



XFWP Series

## 结构参数与机械性能

### Structural parameters and mechanical properties

型号 Type	XFWP-060W	XFWP-90W	XFWP-125W	XFWP-142W	XFWP-143AW	XFWP-190W
内导体外径 (mm) Center Conductor	0.32	0.51	0.72	0.91	1.02	1.40
导体形式 Center Conductor Type	单芯 Solid	单芯 Solid	单芯 Solid	单芯 Solid	单芯 Solid	单芯 Solid
绝缘外径 (mm) Insulation Diameter	0.88	1.40	2.00	2.50	2.79	3.85
外导体外径 (mm) Shields Diameter	1.50	2.10	2.80	3.30	3.55	4.65
总外径(mm) Jacket Diameter	≤1.80	≤2.50	≤3.40	≤3.80	≤4.00	≤5.10
最小弯曲半径(mm) Min.bending radius	9	12	17	19	20	26

# 电气与环境性能

## Electrical and Environmental Performance

型号 Type	XFWP-060W	XFWP-90W	XFWP-125W	XFWP-142W	XFWP-143AW	XFWP-190W		
特性阻抗(ohms) Impedance	50	50	50	50	50	50		
电容(pf/m) Capacitance	88	85	83	83	83	83		
工作频率(GHz) Frequency Range	DC-110	DC-67	DC-50	DC-40	DC-40	DC-26.5		
传输速率 Velocity of Propagation	79%	80%	82%	82%	82%	83%		
最大工作电压 (kV) Max.Operating Voltage	0.4	0.8	1.0	1.2	1.2	1.3		
屏蔽效率 (dB@1GHz) Shielding Effectiveness	≥90	≥90	≥90	≥90	≥90	≥90		
损耗 Loss	dB/m kW		dB/m kW		dB/m kW		dB/m kW	
功率 power	dB/m kW		dB/m kW		dB/m kW		dB/m kW	
0.5GHz	0.71 0.071	0.44 0.136	0.31 0.581	0.26 0.708	0.22 0.959	0.19 1.316		
1GHz	1.02 0.050	0.63 0.096	0.44 0.408	0.36 0.499	0.32 0.675	0.26 0.925		
3GHz	1.81 0.028	1.10 0.055	0.78 0.232	0.61 0.285	0.55 0.386	0.44 0.526		
6GHz	2.62 0.020	1.58 0.038	1.13 0.161	0.86 0.200	0.79 0.270	0.63 0.367		
8GHz	3.06 0.017	1.84 0.033	1.32 0.138	0.99 0.172	0.92 0.232	0.73 0.315		
10GHz	3.46 0.015	2.07 0.029	1.48 0.123	1.10 0.154	1.04 0.207	0.81 0.280		
15GHz	4.33 0.012	2.57 0.024	1.85 0.099	1.36 0.124	1.28 0.167	0.99 0.226		
18GHz	4.80 0.011	2.84 0.022	2.05 0.090	1.58 0.113	1.41 0.152	1.08 0.204		
26.5GHz	5.98 0.008	3.50 0.018	2.54 0.072	2.09 0.092	1.74 0.124	1.35 0.166		
40GHz	7.61 0.007	4.39 0.014	3.21 0.058	2.64 0.074	2.18 0.099	-	-	
50GHz	8.69 0.006	4.97 0.012	3.66 0.051	-	-	-	-	
67GHz	10.37 0.005	5.87 0.011	-	-	-	-	-	
90GHz	12.45 0.004	-	-	-	-	-	-	
110GHz	14.13 0.003	-	-	-	-	-	-	
机械相位稳定性 (18GHz) Phase Stability vs Flexure (最小弯曲半径缠绕一圈)	±0.3°/GHz	±0.3°/GHz	±0.4°/GHz	±0.4°/GHz	±0.4°/GHz	±0.4°/GHz		
相位温度稳定性 (ppm) -55°C~+85°C Phase Change vs 使用温度范围 (°C) Temperature Range	≤850ppm	≤800ppm	≤750ppm	≤750ppm	≤750ppm	≤750ppm		
	-65~+165	-65~+165	-65~+165	-65~+165	-65~+165	-65~+165		

损耗 (+25°C室温)和功率 (+40°C室温, 海平面, 驻波1:1)

Insertion Loss (+25°C Ambient temperature) and Power (+40°C Ambient Temperature, Sea Level, VSWR1:1)



## 结构参数与机械性能

### Structural parameters and mechanical properties

型号 Type	XFWP-142D	XFWP-190D	XFWP-220D	XFWP-311D	XFWP-400D	XFWP-480D
内导体外径 (mm) Center Conductor	0.90	1.45	1.65	2.35	3.00	3.80
导体形式 Center Conductor Type	多股 Stranded	多股 Stranded	多股 Stranded	多股 Stranded	多股 Stranded	多股 Stranded
绝缘外径 (mm) Insulation Diameter	2.40	3.85	4.40	6.30	7.80	9.80
外导体外径 (mm) Shields Diameter	3.20	4.60	5.35	7.50	9.10	10.70
总外径(mm) Jacket Diameter	≤3.60	≤5.00	≤5.90	≤8.10	≤10.20	≤12.20
最小弯曲半径(mm) Min.bending radius	18	26	30	40	50	60

## 电气与环境性能

### Electrical and Environmental Performance

型号 Type	XFWP-142D	XFWP-190D	XFWP-220D	XFWP-311D	XFWP-400D	XFWP-480D
特性阻抗(ohms) Impedance	50	50	50	50	50	50
电容(pf/m) Capacitance	83	83	83	83	83	83
工作频率(GHz) Frequency Range	DC-40	DC-18	DC-18	DC-18	DC-12	DC-8
传输速率 Velocity of Propagation	82%	83%	83%	83%	83%	84%
最大工作电压 (kV) Max.Operating Voltage	1.2	1.3	2.0	3.0	4.0	5.0
屏蔽效率 (dB@1GHz) Shielding Effectiveness	≥90	≥90	≥90	≥90	≥90	≥90

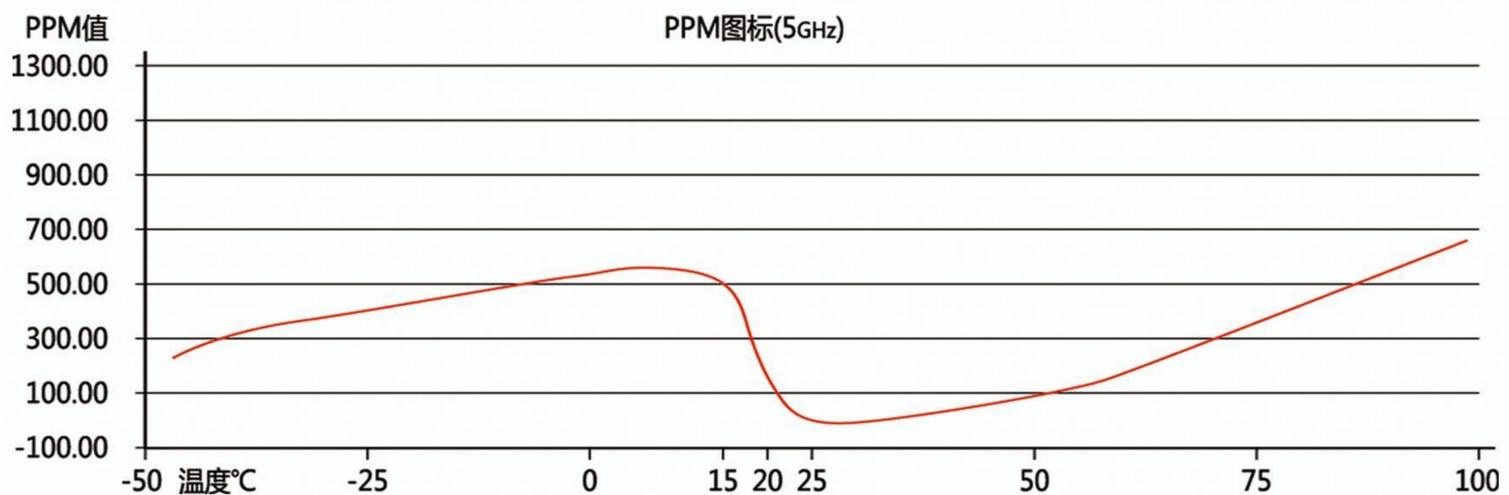
# 电气与环境性能

## Electrical and Environmental Performance

型号 Type	XFWP-142D	XFWP-190D	XFWP-220D	XFWP-311D	XFWP-400D	XFWP-480D
频率 Frequency	dB/m kW					
0.5GHz	0.35 0.587	0.24 1.104	0.21 1.324	0.16 2.111	0.12 3.047	0.10 2.761
1GHz	0.55 0.415	0.34 0.777	0.30 0.930	0.21 1.486	0.17 2.132	0.15 1.937
3GHz	0.96 0.238	0.60 0.443	0.53 0.528	0.38 0.848	0.30 1.200	0.26 1.098
4GHz	1.11 0.206	0.69 0.382	0.62 0.455	0.44 0.731	0.35 1.030	0.31 0.943
6GHz	1.37 0.167	0.86 0.309	0.77 0.368	0.54 0.592	0.44 0.828	0.38 0.762
8GHz	1.59 0.144	1.00 0.266	0.89 0.316	0.63 0.510	0.51 0.708	0.44 0.653
10GHz	1.78 0.129	1.12 0.237	1.00 0.281	0.71 0.454	0.57 0.627	- -
12GHz	1.96 0.117	1.24 0.215	1.11 0.255	0.78 0.412	0.63 0.566	- -
15GHz	2.20 0.105	1.39 0.191	1.25 0.226	0.88 0.366	- -	- -
18GHz	2.42 0.095	1.54 0.173	1.38 0.205	0.97 0.332	- -	- -
26.5GHz	2.97 0.077	1.90 0.138	- -	- -	- -	- -
40GHz	3.71 0.062	- -	- -	- -	- -	- -
机械相位稳定性 (18GHz) Phase Stability vs Flexure (最小弯曲半径缠绕一圈)	±0.4°/GHz	±0.4°/GHz	±0.4°/GHz	±0.4°/GHz	±0.5°/GHz	±0.5°/GHz
相位温度稳定性 (ppm) -55°C~+85°C Phase Change vs	≤850ppm	≤850ppm	≤850ppm	≤850ppm	≤750ppm	≤750ppm
使用温度范围 (°C) Temperature Range	-65~+165	-65~+165	-65~+165	-65~+165	-65~+165	-65~+165

损耗 (+25°C室温)和功率 (+40°C室温, 海平面, 驻波1:1)

Insertion Loss (+25°C Ambient temperature) and Power (+40°C Ambient Temperature, Sea Level, VSWR1:1)





## 产品介绍

### Product introduction

XFXP系列柔性低损耗同轴射频电缆采用了特殊的结构与先进的生产工艺，使得电缆在全频段范围内有着优良的电气与机械性能指标，并具有很高的性价比，是XFWP系列的首选低成本方案。

电气性能方面，信号传输速率达77%，温度相位稳定性小于1300PPM，还具有损耗低，驻波低，屏蔽效率高等特点。

机械性能方面，整体低密度PTFE绝缘和镀银铜带绕包，使得电缆有更好的弯曲性和较优良的机械相位稳定性

耐环境性方面，该电缆采用耐环境性能优越的FEP、PFA等原材料，使其具有使用温度范围宽、抗腐蚀性、防霉防潮、阻燃等特点。

XFXP series Flexible low loss cable adopts the structure of special design and advanced production technology, make the cable in the range of frequencies has excellent electric and mechanical performance, and has a high cost performance, is the first selection of XFWP series low cost solution.

The electrical properties of the signal transmission rate reaches 77%, temperature phase stability is less than 1300 PPM, but also has low loss, low standing wave, shielding efficiency higher characteristic.

Mechanical performance, integral low density PTFE insulation and silver plated copper tape wrapped, the cable has a better bending and the excellent mechanical stability of the phase

Environmental resistant, the cable is made of FEP, PFA and other raw materials with superior environmental resistance, make its have use temperature scope wide, corrosion resistance, mouldproof moistureproof, flame retardant etc.

## 柔性低损耗同轴射频电缆 Flexible low loss coaxial RF cable

# FXP

## 结构说明

### Construction Instruction

1.内导体：采用单芯或绞合镀银线。在相同外径的情况下单芯内导体有更低的损耗，在弯曲情况下有更好的机械相位稳定性；绞合导体较为柔软，有更好的弯曲性和弯曲疲劳使用寿命。

2.绝缘：采用整体低密度PTFE，介电常数1.65左右，整体绝缘结构能使电缆外径和绝缘介电常数稳定，保障了信号的稳定传输。

3.屏蔽层：采用双屏蔽层+中间层（多芯内导体）结构，内屏蔽层采用镀银铜带绕包，外屏蔽层采用镀银铜线编织，内屏蔽与外屏蔽之间采用氟塑料中间层。镀银铜带绕包使电缆的损耗降低，屏蔽效率增加，高密度编织层是电缆的抗拉强度增加，氟塑料中间层使电缆稳定性更高，使用寿命增加。

4.护套：采用了环境适应性能优越的FEP或PFA等原材料，是电缆具有较高的环境适应性。

1. The inner conductor: The single core or twisted plating silver thread. In the same order of outer diameter core inner conductor has lower loss, in bending cases have better mechanical phase stability; Stranded conductor is relatively soft, have better bending resistance and bending fatigue life.

2. Insulation: Adopt overall low density PTFE, dielectric constant of 1.65 or so, the overall insulating structure can make the cable diameter and insulating dielectric constant stability, guarantee the stability of the signal transmission.

3. Shield: Adopt double shield layer + intermediate layer (Stranded inner conductor) structure, the shielding layer using silver plating copper strap bag, the shielding layer using silver plated copper wire braided, fluorine plastic intermediate layer is used between the inner shield and the outer shield. The silver-plated copper tape is wrapped to reduce the loss of the cable and increase the shielding efficiency. The high-density braided layer increases the tensile strength of the cable. The fluorine plastic intermediate layer makes the cable more stable and increases the service life.

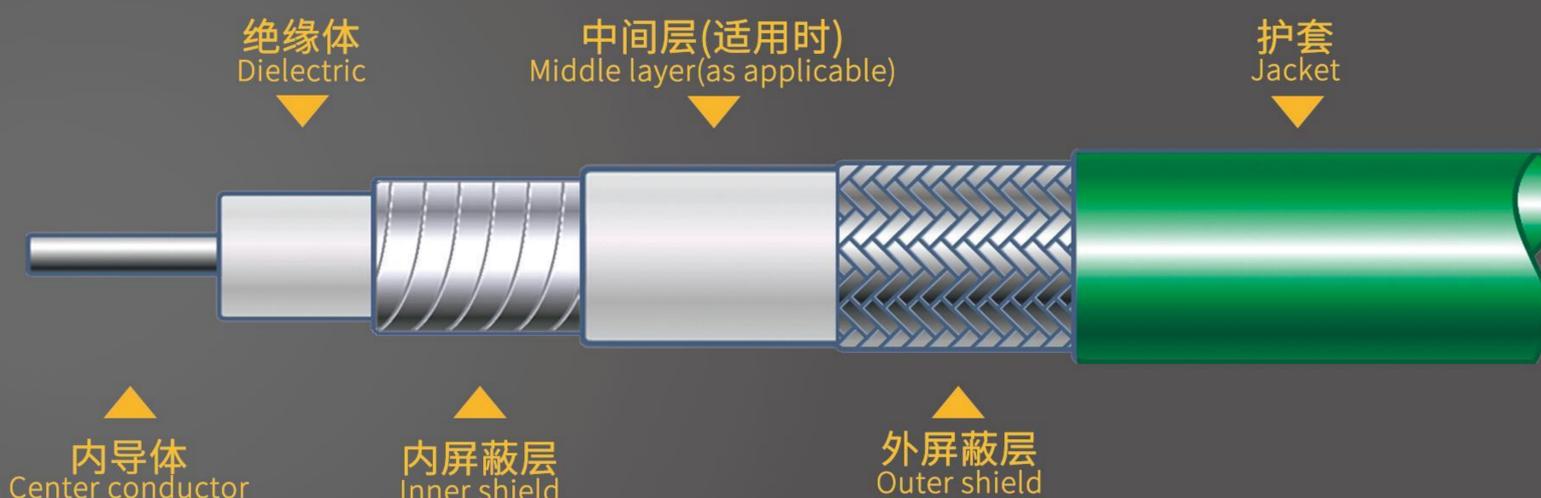
4. Jacket: Raw materials such as FEP or PFA with superior environmental adaptability are used, cable has high environmental adaptability.

## 应用领域

### Application Field

适用于对相位一致性有较高要求的整机系统，如：预警、制导、战术雷达和信息通信、电子对抗及遥感、卫星通信、微波测试等系统。

Application for the whole system with high requirements for phase consistency, such as early warning, guidance, tactical radar and information communication, electronic countermeasures and remote sensing, satellite communication, microwave test and so on.



XFXP Series

## 结构参数与机械性能

### Structural parameters and mechanical properties

型号 Type	XFXP-061	XFXP-072	XFXP-091	XFXP-130
内导体外径 (mm) Center Conductor	0.28	0.35	0.51	0.72
导体形式 Center Conductor Type	单芯 Solid	单芯 Solid	单芯 Solid	单芯 Solid
绝缘外径 (mm) Insulation Diameter	0.80	1.00	1.45	2.05
外导体外径 (mm) Shields Diameter	1.20	1.40	1.98	2.70
总外径(mm) Jacket Diameter	≤1.50	≤1.80	≤2.35	≤3.20
最小弯曲半径(mm) Min.bending radius	8	9	15	16

# 电气与环境性能

## Electrical and Environmental Performance

型号 Type	XFXP-061	XFXP-072	XFXP-091	XFXP-130
特性阻抗(ohms) Impedance	50	50	50	50
电容(pf/m) Capacitance	88	88	88	87
工作频率(GHz) Frequency Range	DC-110	DC-110	DC-67	DC-50
传输速率 Velocity of Propagation	76%	76%	77%	77%
最大工作电压 (kV) Max.Operating Voltage	0.4	0.4	0.8	1.2
屏蔽效率 (dB@1GHz) Shielding Effectiveness	≥90	≥90	≥90	≥90
损耗 功率 Loss power	dB/m kW	dB/m kW	dB/m kW	dB/m kW
0.5GHz	0.81 0.062	0.65 0.078	0.44 0.141	0.32 0.569
1GHz	1.15 0.043	0.93 0.055	0.63 0.099	0.45 0.400
3GHz	2.04 0.025	1.66 0.031	1.11 0.057	0.80 0.227
6GHz	2.95 0.017	2.41 0.021	1.59 0.040	1.15 0.158
8GHz	3.45 0.015	2.82 0.018	1.85 0.034	1.34 0.136
10GHz	3.89 0.013	3.19 0.016	2.09 0.030	1.51 0.120
15GHz	4.87 0.010	4.00 0.013	2.59 0.024	1.89 0.097
18GHz	5.39 0.009	4.44 0.012	2.86 0.022	2.09 0.088
26.5GHz	6.72 0.007	5.55 0.009	3.53 0.018	2.59 0.071
40GHz	8.53 0.006	7.08 0.007	4.43 0.014	3.28 0.056
50GHz	9.73 0.005	8.10 0.006	5.02 0.012	3.74 0.048
67GHz	11.61 0.004	9.69 0.005	5.93 0.010	- -
90GHz	13.91 0.003	11.66 0.004	- -	- -
110GHz	15.78 0.003	13.26 0.004	- -	- -
机械相位稳定性 (18GHz) Phase Stability vs Flexure (最小弯曲半径缠绕一圈)	±0.3°/GHz	±0.3°/GHz	±0.4°/GHz	±0.4°/GHz
相位温度稳定性 (ppm) -55°C~+85°C Phase Change vs 使用温度范围 (°C) Temperature Range	≤1300ppm -65~+165	≤1300ppm -65~+165	≤1300ppm -65~+165	≤1300ppm -65~+165

损耗 (+25°C室温时的典型值)和传输功率 (+40°C室温, 海平面时的典型值)

Insertion Loss (Typical value at +25°C Ambient temperature) and Transmission power (Typical value at +40°C Ambient Temperature, Sea Level)

## 结构参数与机械性能

### Structural parameters and mechanical properties

型号 Type	XFXP-150	XFXP-150D	XFXP-155B	XFXP-216	XFXP-216D
内导体外径 (mm) Center Conductor	0.93	0.90	0.84	1.45	1.50
导体形式 Center Conductor Type	单芯 Solid	多股 Stranded	单芯 Solid	单芯 Solid	多股 Stranded
绝缘外径 (mm) Insulation Diameter	2.70	2.50	2.50	4.30	4.30
外导体外径 (mm) Shields Diameter	3.35	3.30	3.35	4.90	4.90
总外径(mm) Jacket Diameter	≤3.80	≤3.80	≤4.20	≤5.50	≤5.50
最小弯曲半径(mm) Min.bending radius	19	19	21	28	28
结构说明 STRUCTURE DESCRIPTION	-	D-外导体含中间层 outer conductor contains an intermediate layer	B-聚氨酯护套 Polyurethanesheath (外导体含中间层 outer conductor contains an intermediate layer)	-	D-外导体含中间层 outer conductor contains an intermediate layer

## 电气与环境性能

### Electrical and Environmental Performance

型号 Type	XFXP-150	XFXP-150D	XFXP-155B	XFXP-216	XFXP-216D
特性阻抗(ohms) Impedance	50	50	50	50	50
电容(pf/m) Capacitance	88	88	88	88	88
工作频率(GHz) Frequency Range	DC-40	DC-40	DC-50	DC-26.5	DC-26.5
传输速率 Velocity of Propagation	77%	77%	77%	77%	77%
最大工作电压 (kV) Max.Operating Voltage	1.2	1.2	1.2	2.0	2.0
屏蔽效率 (dB@1GHz) Shielding Effectiveness	≥90	≥90	≥90	≥90	≥90

## 电气与环境性能

### Electrical and Environmental Performance

型号 Type	XFXP-150		XFXP-150D		XFXP-155B		XFXP-216		XFXP-216D		
损耗 Loss	功率 power	dB/m	kW	dB/m	kW	dB/m	kW	dB/m	kW	dB/m	kW
0.5GHz		0.24	0.603	0.35	0.503	0.26	0.766	0.16	1.132	0.23	0.943
1GHz		0.34	0.425	0.51	0.354	0.38	0.539	0.22	0.794	0.33	0.662
3GHz		0.61	0.243	0.89	0.203	0.67	0.306	0.41	0.448	0.59	0.373
4GHz		0.71	0.210	1.04	0.175	0.78	0.264	0.48	0.385	0.69	0.321
6GHz		0.89	0.170	1.29	0.142	0.97	0.214	0.60	0.310	0.86	0.258
8GHz		1.04	0.147	1.51	0.123	1.13	0.184	0.70	0.266	1.02	0.222
10GHz		1.18	0.131	1.70	0.109	1.28	0.163	0.80	0.235	1.15	0.196
12GHz		1.30	0.119	1.88	0.099	1.42	0.148	0.89	0.213	1.28	0.178
15GHz		1.48	0.106	2.13	0.088	1.60	0.131	1.01	0.188	1.46	0.157
18GHz		1.64	0.096	2.36	0.080	1.78	0.119	1.13	0.170	1.63	0.142
26.5GHz		2.05	0.078	2.93	0.065	2.22	0.096	1.43	0.137	2.05	0.114
40GHz		2.61	0.063	3.72	0.053	2.82	0.077	-	-	-	-
机械相位稳定性 (18GHz) Phase Stability vs Flexure (最小弯曲半径缠绕一圈)		±0.5°/GHz		±0.5°/GHz		±0.5°/GHz		±0.6°/GHz		±0.6°/GHz	
相位温度稳定性 (ppm) -55°C~+85°C Phase Change vs		≤1300ppm		≤1300ppm		≤1300ppm		≤1300ppm		≤1300ppm	
使用温度范围 (°C) Temperature Range		-65~+165		-65~+165		-65~+165		-65~+165		-65~+165	

损耗 (+25°C室温时的典型值)和传输功率 (+40°C室温, 海平面时的典型值)

Insertion Loss (Typical value at +25°C Ambient temperature) and Transmission power (Typical value at +40°C Ambient Temperature, Sea Level)



## 产品介绍

### Product introduction

XFX系列电缆采用了双层屏蔽镀银铜带绕包加圆线编织的生产工艺，使得电缆在全频段范围内有着优良的电气与机械性能指标，并具有很高的性价比，是低损耗低成本方案选择之一。

电气性能方面，信号传输速率70%，还具有损耗低，驻波低，屏蔽效率高等特点。

机械性能方面，使该系列电缆有很好的柔韧性，机械相位稳定

耐环境性方面，该电缆采用耐环境性能优越的FEP原材料，使其具有使用温度范围宽、抗腐蚀性、防霉防潮、阻燃等特点。

XFX series with a double-layer cable shielding copper with silver plated round bag with round wire weaving production process, make the cable in the range of frequencies has excellent electric and mechanical performance, and has the very high cost performance, low loss and low cost is one of the options.

Electrical performance, signal transmission rate of 70%, but also has low loss, low standing wave, shielding efficiency higher characteristic.

Mechanical performance, making the series cable has good flexibility, stable mechanical phase

Resistance to environmental aspects, The cable is made of FEP material with superior environmental resistance, has the use temperature scope width, corrosion resistance, mouldproof moistureproof, flame retardant, etc.

XFX Series

柔性低损耗同轴射频电缆  
Flexible low loss coaxial RF cable

# XFX

## 结构说明

### Construction Instruction

- 1.内导体：单根镀银铜线。
- 2.绝缘：采用PTFE，传输速率70%
- 3.屏蔽层：采用双屏蔽层结构，内屏蔽层采用镀银铜带绕包，此类结构有损耗低，屏蔽高，外屏蔽层采用镀银铜线编织，保证了电缆的抗拉强度。
- 4.护套：采用了FEP护套，使电缆具有较高的环境适用性。

1. The inner conductor: single silver plated copper wire.

2. Insulation: Adopt PTFE, transmission rate of 70%

3. Shield: Adopt double shield layer structure, the inner shielding layer is wrapped with silver plated copper tape, this structure has low loss, high block, the outer shielding layer is braided by silver-plated copper wire, ensure that the cable's tensile strength.

4. Jacket: used the FEP sheath, the cable has high environmental suitability.

## 应用领域

### Application Field

适用于各种射频信号传输的仪器设备中，能满足实验室测试，仪器仪表、航空航天、相控阵雷达等对屏蔽效率有较高要求的应用领域。

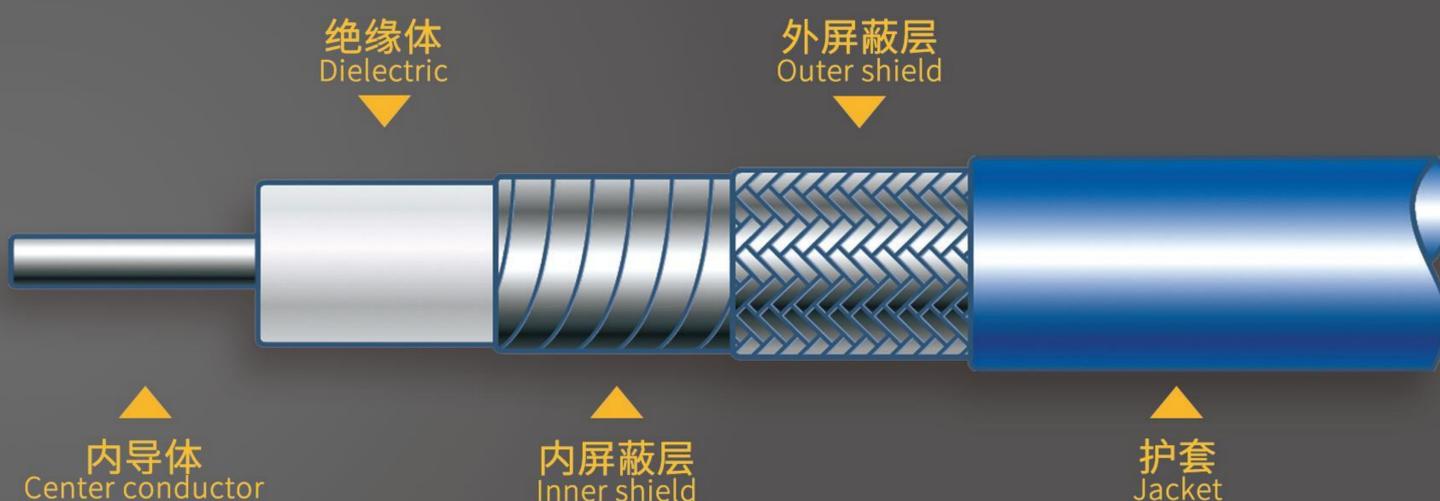
Applicable to all kinds of rf signal transmission equipment, can satisfy the lab test, instrument and meter, aerospace, phased array radar on the shielding efficiency have higher requirements of applications.

实验室测试  
Lab test

仪器仪表  
Instrument and meter

航空航天  
Aerospace

相控阵雷达  
Phased array radar



XFX Series

## 结构参数与机械性能

### Structural parameters and mechanical properties

型号 Type	XFX-047	XFX-086	XFX-141
内导体外径 (mm) Center Conductor	0.28	0.915	0.92
导体形式 Center Conductor Type	单芯 Solid	单芯 Solid	单芯 Solid
绝缘外径 (mm) Insulation Diameter	0.87	1.65	2.98
外导体外径 (mm) Shields Diameter	1.25	2.16	3.65
总外径(mm) Jacket Diameter	≤1.50	≤2.64	≤4.17
最小弯曲半径(mm) Min.bending radius	6.5	13	21

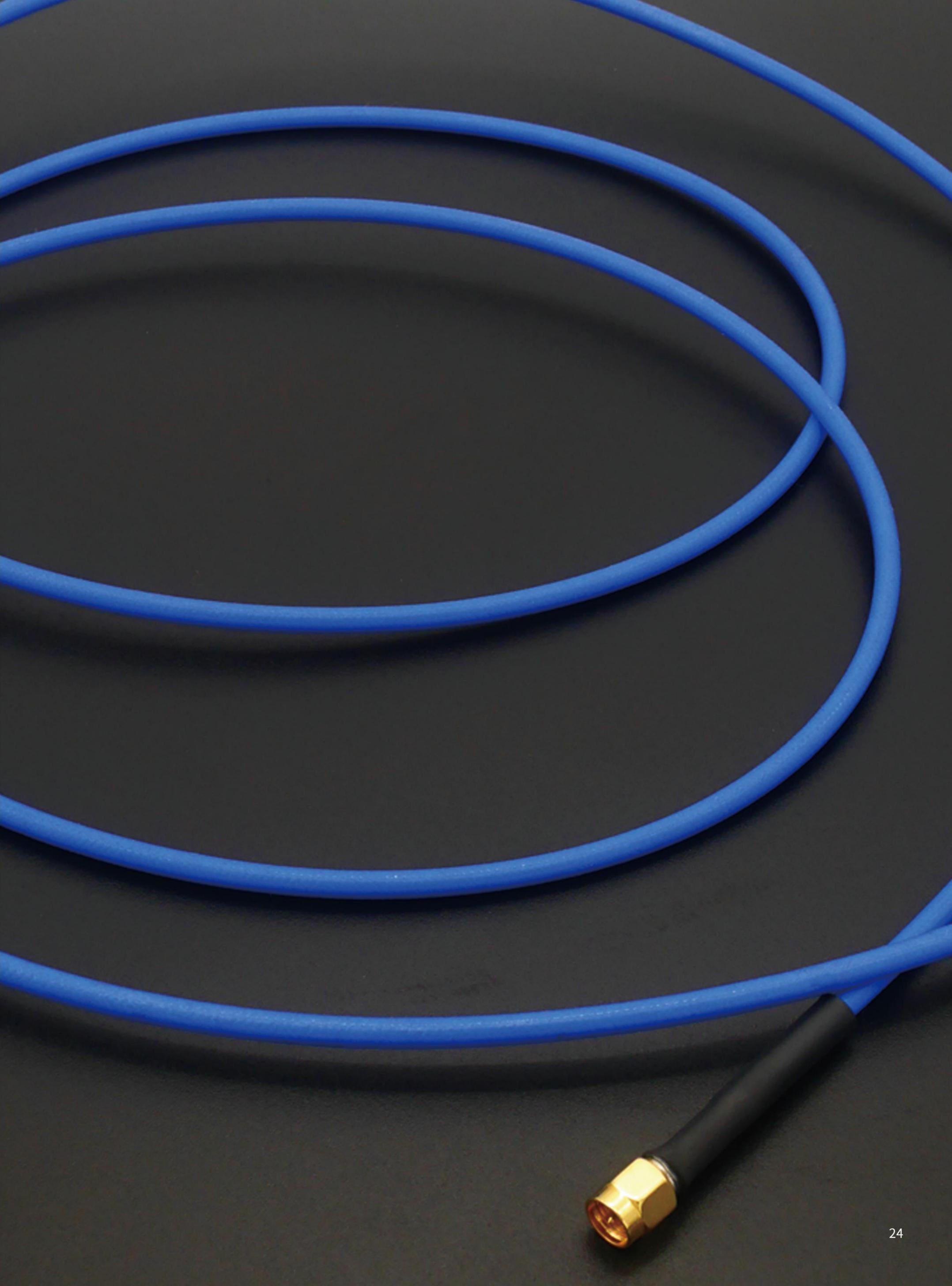
## 电气与环境性能

### Electrical and Environmental Performance

型号 Type	XFX-047		XFX-086		XFX-141		
损耗 Loss	功率 power	dB/m	kW	dB/m	kW	dB/m	kW
0.5GHz		1.00	0.054	0.54	0.159	0.30	0.375
1GHz		1.43	0.038	0.77	0.111	0.44	0.260
3GHz		2.52	0.022	1.38	0.062	0.81	0.143
2GHz		2.93	0.019	1.61	0.053	0.95	0.121
6GHz		3.62	0.015	2.01	0.043	1.20	0.096
8GHz		4.22	0.013	2.35	0.037	1.43	0.088
10GHz		4.76	0.012	2.67	0.032	1.63	0.071
12GHz		5.25	0.010	2.96	0.029	1.82	0.064
15GHz		5.92	0.009	3.36	0.026	2.09	0.056
18GHz		6.54	0.008	3.74	0.023	2.35	0.050
26.5GHz		8.10	0.007	4.70	0.019	3.01	0.039
40GHz		10.20	0.006	6.03	0.015	3.95	0.030
50GHz		11.59	0.005	-	-	-	-
67GHz		13.73	0.004	-	-	-	-
90GHz		16.34	0.003	-	-	-	-
110GHz		18.43	0.003	-	-	-	-
使用温度范围 (°C) Temperature Range		65~+165		65~+165		65~+165	

损耗 (+25°C室温时的典型值)和传输功率 (+40°C室温, 海平面时的典型值)

Insertion Loss (Typical value at +25°C Ambient temperature) and Transmission power (Typical value at +40°C Ambient Temperature, Sea Level)



# 02

## 柔性低损耗 同轴射频电 缆

Flexible low loss  
coaxial RF cable

25-44





系列电缆采用了特殊的结构与先进的生产工艺，使得电缆在全频段范围内有着优良的电气与机械性能指标，并具有很高的性价比，是XFWP低损耗低成本替代方案的首选。

Series cable adopts special structure design and advanced production technology, which makes the cable have excellent electrical and mechanical performance index in the full frequency range, and has high cost performance ratio. It is the first choice of xfwp low loss and low cost alternative.

- 
- XFBP series
  - SFCJ series
  - XFLL series
  - XYMR series

## 产品介绍

### Product introduction

XFBP系列电缆采用了特殊的结构与先进的生产工艺，使得电缆在全频段范围内有着优良的电气与机械性能指标，并具有很高的性价比，是低损耗首选的低成本方案。

电气性能方面，信号传输速率达77%或80%，温度相位稳定性小于1300PPM，还具有损耗低，驻波低，屏蔽效率高等特点。

机械性能方面，由于电缆采用扁带编织，使该系列电缆有很强的抗扭能力。

耐环境性方面，该电缆采用耐环境性能优秀的原材料，使其具有使用温度范围宽、抗腐蚀性、防霉防潮、阻燃等特点。

XFBP series cable of the special structure design and advanced production technology, making the cable in the whole frequency range has excellent electrical and mechanical performance, and the high ratio of performance to price is low loss preferred low cost solution.

The electrical properties of the signal transmission rate reaches 77% or 80%, temperature phase stability is less than 1300 PPM, but also has low loss, low standing wave, shielding efficiency higher characteristic.

Mechanical properties, due to cable using flat ribbon weaving, make this series of cable have very strong torsional capacity.

Environmental resistant, the cable using resistance to environmental performance excellent raw material, make its have use temperature scope wide, corrosion resistance, mouldproof moistureproof, flame retardant etc.

## 低损耗稳相同轴射频电缆 Low loss stable phase coaxial RF cable

# XFBP

## 结构说明

### Construction Instruction

1.内导体：采用单芯或绞合镀银线。在相同外径的情况下单芯内导体有更低的损耗，在弯曲情况下有更好的机械相位稳定性；绞合导体较为柔软，有更好的弯曲性和弯曲疲劳使用寿命。

2.绝缘：采用微孔低密度PTFE和整体低密度PTFE，多层绕包结构能使电缆外径和绝缘介电常数稳定，保障了信号的稳定传输。

3.屏蔽层：采用三屏蔽层结构，内屏蔽层采用镀银铜带编织，中间采用聚酰亚胺薄膜绕包，外屏蔽层采用镀银铜线编织。此类结构有损耗低，屏蔽高，并有较强的抗扭能力。

4.护套：采用了环境适应性能优越的FEP或PFA，是电缆具有较高的环境适应性。

1. The inner conductor: the single core or twisted plating silver thread. In the same order of outer diameter core inner conductor has lower loss, in bending cases have better mechanical phase stability; Stranded conductor is relatively soft, have better bending resistance and bending fatigue life.

2. Insulation: Microporous low density PTFE and integral low density PTFE were used, multilayer wrapped structure can make the cable diameter and insulating dielectric constant stability, safeguard the stability of the signal transmission.

3. Shield: the three shielding layer structure, the shielding layer using silver plating copper strip weaving, and the middle is polyimide film wrapped, the shielding layer using silver plated copper wire braided. This kind of structure has low loss and high shielding, and have strong torsional capacity.

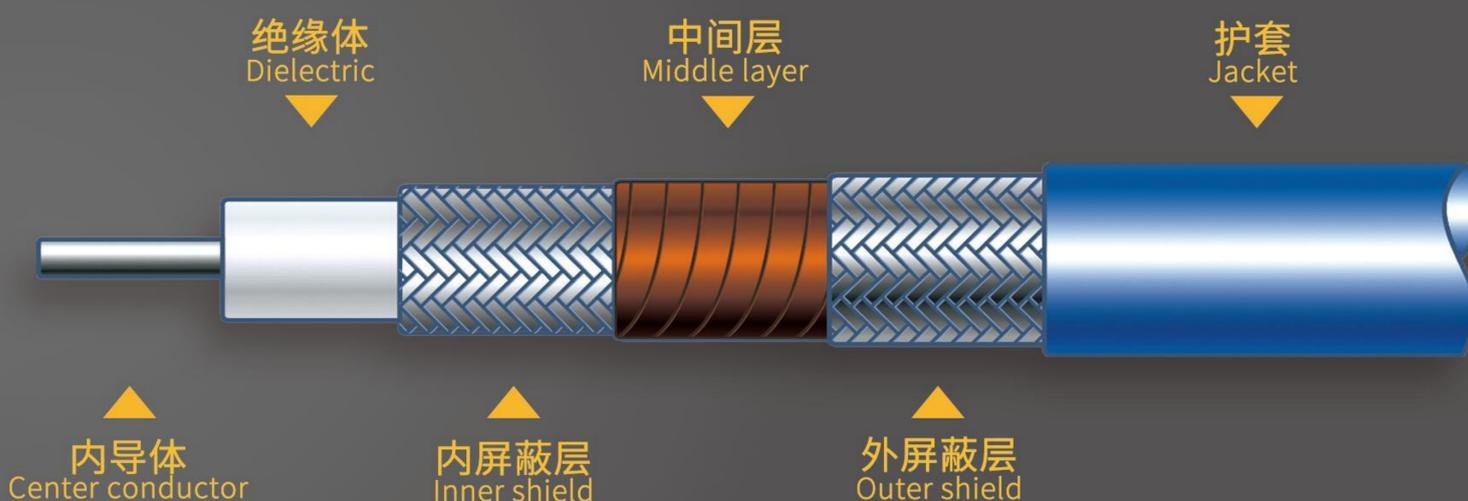
4. Jacket: using the environment to adapt to the superior performance of FEP or PFA, cable has high environmental adaptability.

## 应用领域

### Application Field

适用于对相位一致性有较高要求的整机系统，如：预警、制导、战术雷达和信息通信、电子对抗及遥感、卫星通信、微波测试等系统。

Application for the whole system with high requirements for phase consistency, such as early warning, guidance, tactical radar and information communication, electronic countermeasures and remote sensing, satellite communication, microwave test and so on.



XFBP Series

## 结构参数与机械性能

### Structural parameters and mechanical properties

型号 Type	XFBP-142	XFBP-205	XFBP-304	XFBP-310
内导体外径 (mm) Center Conductor	1.02	1.29	1.57	2.00
导体形式 Center Conductor Type	单芯 Solid	单芯 Solid	单芯 Solid	单芯 Solid
绝缘外径 (mm) Insulation Diameter	2.95	3.80	4.70	5.85
外导体外径 (mm) Shields Diameter	3.70	4.50	5.70	7.00
总外径(mm) Jacket Diameter	≤4.30	≤5.20	≤6.20	≤7.70
最小弯曲半径(mm) Min.bending radius	22	26	30	39

# 电气与环境性能

## Electrical and Environmental Performance

型号 Type	XFBP-142		XFBP-205		XFBP-304		XFBP-310	
特性阻抗(ohms) Impedance	50		50		50		50	
电容(pf/m) Capacitance	88		88		88		88	
工作频率(GHz) Frequency Range	DC-18		DC-18		DC-18		DC-18	
传输速率 Velocity of Propagation	76%		76%		76%		76%	
最大工作电压 (kV) Max.Operating Voltage	1.0		1.0		2.0		3.0	
屏蔽效率 (dB@1GHz) Shielding Effectiveness	≥90		≥90		≥90		≥90	
频率Frequency	dB/m	kW	dB/m	kW	dB/m	kW	dB/m	kW
0.5GHz	0.25	0.432	0.20	0.618	0.15	0.841	0.11	1.230
1GHz	0.36	0.303	0.28	0.431	0.20	0.586	0.17	0.853
3GHz	0.62	0.171	0.49	0.241	0.36	0.326	0.30	0.471
4GHz	0.72	0.147	0.57	0.207	0.44	0.279	0.36	0.401
6GHz	0.89	0.118	0.70	0.166	0.55	0.223	0.45	0.319
8GHz	1.03	0.101	0.82	0.141	0.69	0.189	0.53	0.270
10GHz	1.16	0.090	0.92	0.125	0.72	0.167	0.61	0.237
12GHz	1.28	0.081	1.01	0.112	0.76	0.150	0.68	0.213
15GHz	1.44	0.072	1.14	0.099	0.85	0.132	0.78	0.186
18GHz	1.59	0.065	1.26	0.089	1.07	0.118	0.88	0.166
机械相位稳定性 (18GHz) Phase Stability vs Flexure (最小弯曲半径缠绕一圈)	±0.4°/GHz		±0.5°/GHz		±0.5°/GHz		±0.5°/GHz	
相位温度稳定性 (ppm) -55°C~+85°C Phase Change vs Temperature	≤1300ppm		≤1300ppm		≤1300ppm		≤1300ppm	
使用温度范围 (°C) Temperature Range	-65~+165		-65~+165		-65~+165		-65~+165	

损耗 (+25°C室温)和功率 (+40°C室温, 海平面, 驻波1:1)

Insertion Loss (+25°C Ambient temperature) and Power (+40°C Ambient Temperature, Sea Level, VSWR1:1)

备注: 1.上表所列损耗值为未含连接器标称值, 连接器按 $2 \times 0.03 \sqrt{f}$ (GHz)计算

2.机械相位稳定性与测试方法密切相关, 如用其他方法测试, 数值可能发生变化。

1. The loss shown does not include the connector, the connector according to  $2 \times 0.03 \sqrt{f}$ (GHz) calculation.

2.Is closely related to the phase stability and mechanical testing methods, such as test with other methods, numerical might change.

## 结构参数与机械性能

### Structural parameters and mechanical properties

型号 Type	XFBP-480 (J)	XFBP-530 (J)
内导体外径 (mm) Center Conductor	3.35	3.66
导体形式 Center Conductor Type	多股 Stranded	多股 Stranded
绝缘外径 (mm) Insulation Diameter	9.05	10.30
外导体外径 (mm) Shields Diameter	10.30	11.00
总外径(mm) Jacket Diameter	≤11.45 (FEP) ≤12.30 (TPU)	≤12.30 (FEP) ≤13.50 (TPU)
最小弯曲半径(mm) Min.bending radius	64	69

## 电气与环境性能

### Electrical and Environmental Performance

型号 Type	XFBP-480 (J)	XFBP-530 (J)
特性阻抗(ohms) Impedance	50	50
电容(pf/m) Capacitance	85	85
工作频率(GHz) Frequency Range	DC-12	DC-10
传输速率 Velocity of Propagation	80%	80%
最大工作电压 (kV) Max.Operating Voltage	5	5
屏蔽效率 (dB@1GHz) Shielding Effectiveness	≥90	≥90

## 电气与环境性能

### Electrical and Environmental Performance

型号 Type	XFBP-480 (J)			XFBP-480 (J)		
	dB/m	kW		dB/m	kW	
频率Frequency		FEP	TPU		FEP	TPU
0.5GHz	0.10	2.570	0.912	0.08	2.805	1.003
1GHz	0.15	1.778	0.630	0.12	1.928	0.687
3GHz	0.27	0.975	0.344	0.22	1.040	0.368
6GHz	0.37	0.657	0.231	0.33	0.691	0.244
10GHz	0.50	0.486	0.170	0.45	0.505	0.177
12GHz	0.55	0.436	0.152	-	-	-
使用温度范围 (°C) Temperature Range	FEP	-65~+165		FEP	-65~+165	
	TPU	-65~+85		TPU	-65~+85	

损耗 (+25°C室温)和功率 (+40°C室温, 海平面, 驻波1:1)

Insertion Loss (+25°C Ambient temperature) and Power (+40°C Ambient Temperature, Sea Level, VSWR1:1)

备注: 1.上表所列损耗值为未含连接器标称值, 连接器按 $2 \times 0.03 \sqrt{f(\text{GHz})}$ 计算

2.机械相位稳定性与测试方法密切相关, 如用其他方法测试, 数值可能发生变化。

1. The loss shown does not include the connector, the connector according to  $2 \times 0.03 \sqrt{f(\text{GHz})}$  calculation.

2.Is closely related to the phase stability and mechanical testing methods, such as test with other methods, numerical might change.



## 产品介绍

### Product introduction

SFCJ系列电缆采用了特殊的结构设计及先进的生产工艺，使得电缆在全频段范围内有着优良的电气与机械性能指标，并具有很高的性价比，是低损耗低成本方案选择之一。

电气性能方面信号传输速率达83%，还具有损耗低，驻波低，屏蔽效率高等特点。

机械性能方面，由于电缆采用扁带编织，使该系列电缆有很强的抗扭能力与良好的柔软度。

耐环境性方面，该电缆采用耐环境性能优秀的原材料，使其具有耐磨损、高弯曲寿命等特点，使用温度为-55℃~+85℃。

SFCJ series cable of the special structure design and advanced production technology, making the cable in the whole frequency range has excellent electrical and mechanical performance, and the high ratio of performance to price is low loss low cost solution one option.

The electrical properties of the signal transmission rate up to 83%, but also has low loss, low standing wave, shielding efficiency higher characteristic.

Mechanical properties, due to cable using flat ribbon weaving, make this series of cable have very strong torsional ability and good softness.

Environmental resistant, the cable using resistance to environmental performance excellent raw material, make its have wear resistance, high bending life etc., using temperature for - 55 °C ~ + 85 °C.

SFCJ Series

柔软低损耗同轴射频电缆

Flexible low loss coaxial RF cable

# SFCJ

## 结构说明

### Construction Instruction

1.内导体：采用绞合镀银线。绞合导体较为柔软，有更好的弯曲性和弯曲疲劳使用寿命。

2.绝缘：采用微孔低密度PTFE，多层绕包结构能使电缆外径和绝缘介电常数稳定，保障了信号的稳定传输。

3.屏蔽层：采用二屏蔽层结构，内外屏蔽层采用镀银铜带编织，此类结构有损耗低，屏蔽高，并具有较强的抗扭能力。

4.护套：采用了TPU护套，使电缆柔软且耐磨。

1. The inner conductor: the twisted plating silver thread. Stranded conductor is relatively soft, have better bending resistance and bending fatigue life.

2. Insulation: using low density PTFE, multilayer wrapped structure can make the cable diameter and insulating dielectric constant stability, safeguard the stability of the signal transmission.

3. Shield: the two shielding layer structure, internal and external shielding layer using silver plating copper strip weaving, this kind of structure has low loss and high shielding, and have strong torsional capacity.

4. Jacket: using the TPU sheath, make cable soft and wear-resisting.

## 应用领域

### Application Field

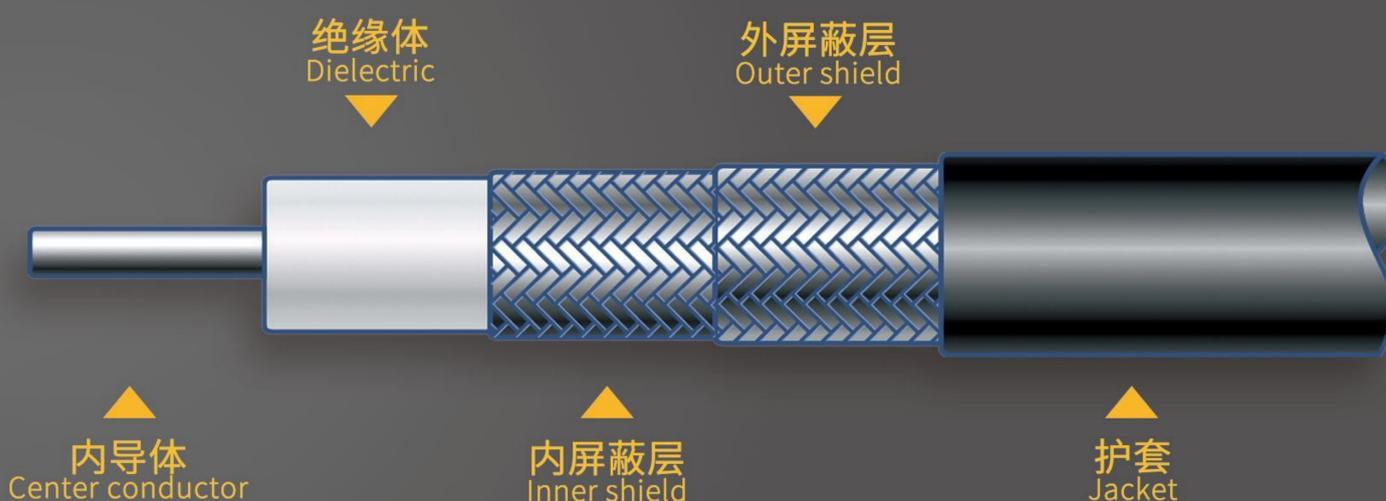
适用于各种射频信号传输的仪器设备中，并可作为室外移动部位的射频信号传输线。

Suitable for all kinds of radio frequency signal transmission equipment, and can be used as outdoor mobile parts of the radio frequency signal transmission line.

信号传输  
Signal transmission

室外移动部位  
Outdoor moving parts

射频信号  
RF signal



SFCJ Series

## 结构参数与机械性能

### Structural parameters and mechanical properties

型号 Type	SFCJ-50-3	SFCJ-50-5	SFCJ-50-7	SFCJ-50-9
内导体外径 (mm) Center Conductor	1.14	1.82	2.65	3.35
导体形式 Center Conductor Type	多股 Stranded	多股 Stranded	多股 Stranded	多股 Stranded
绝缘外径 (mm) Insulation Diameter	2.95	4.95	6.95	9.00
外导体外径 (mm) Shields Diameter	3.60	5.55	7.60	9.80
总外径(mm) Jacket Diameter	≤5.30	≤7.50	≤10.50	≤13.30
最小弯曲半径(mm) Min.bending radius	50	73	105	130

# 电气与环境性能

## Electrical and Environmental Performance

型号 Type	SFCJ-50-3	SFCJ-50-5	SFCJ-50-7	SFCJ-50-9
特性阻抗(ohms) Impedance	50	50	50	50
电容(pf/m) Capacitance	87	87	83	83
工作频率(GHz) Frequency Range	DC-18	DC-18	DC-15	DC-10
传输速率 Velocity of Propagation	81%	81%	81%	81%
最大工作电压 (kV) Max.Operating Voltage	1.0	1.5	2.5	3.0
屏蔽效率 (dB@1GHz) Shielding Effectiveness	≥80	≥80	≥80	≥80
频率Frequency	dB/m      kW	dB/m      kW	dB/m      kW	dB/m      kW
1GHz	0.45    0.131	0.34    0.267	0.18    0.470	0.20    0.664
3GHz	0.74    0.075	0.55    0.152	0.34    0.267	0.39    0.375
6GHz	1.08    0.052	0.80    0.106	0.51    0.187	0.63    0.260
8GHz	1.25    0.045	0.87    0.091	0.58    0.160	0.69    0.223
10GHz	1.43    0.040	1.05    0.081	0.72    0.143	0.76    0.198
12GHz	1.57    0.037	1.17    0.074	0.79    0.129	-       -
15GHz	1.80    0.033	1.39    0.066	0.94    0.115	-       -
18GHz	2.02    0.029	1.58    0.060	-       -	-       -
使用温度范围 (°C) Temperature Range	-55~+85	-55~+85	-55~+85	-55~+85

损耗 (+25°C室温)和功率 (+40°C室温, 海平面, 驻波1:1)

Insertion Loss (+25°C Ambient temperature) and Power (+40°C Ambient Temperature, Sea Level, VSWR1:1)

备注: 1.上表所列损耗值为未含连接器标称值, 连接器按 $2 \times 0.03 \sqrt{f}$ (GHz)计算

2.机械相位稳定性与测试方法密切相关, 如用其他方法测试, 数值可能发生变化。

1. The loss shown does not include the connector, the connector according to  $2 \times 0.03 \sqrt{f}$ (GHz) calculation.

2.Is closely related to the phase stability and mechanical testing methods, such as test with other methods, numerical might change.



## 产品介绍

### Product introduction

XYMR系列电缆采用了发泡PE或PE为绝缘，铝箔+镀锡圆铜线编织屏蔽，交联PE为护套，具有很高的性价比，是XFWP和SFCJ的替代方案的选择之一。

电气性能方面，信号传输速率达83%（PE为66%），还具有损耗低，驻波低，屏蔽效率高等特点。

机械性能方面，由于电缆采用铝箔+镀锡圆铜线编织屏蔽，使该系列电缆有很高的稳定性。

耐环境性方面，该电缆采用防水处理，有很强的防潮性，并采用了阻燃护套。

XYMR series cable adopts the foaming PE insulation or PE insulation, aluminum foil + tinned round copper wire braided shield, crosslinked PE jacket, has the very high cost performance, are XFWP and SFCJ one of the cost alternative choice.

Electrical performance, signal transmission rate was 83% (PE for 66%), and also has low loss, low standing wave ratio, screen efficiency higher characteristic.

Mechanical performance, as the cable is braided by aluminum foil + tinned round copper wire braided shield, the series cable has high stability.

Resistance to environmental aspects, the cable with waterproof processing, have very strong moisture resistance, and flame retardant sheath is adopted.

XYMR Series

低损耗同轴射频电缆

Low loss coaxial RF cable

# XYMR

## 结构说明

### Construction Instruction

1.内导体：采用单芯裸铜线或单芯铜包铝线，在相同外径的情况下单芯内导体有更低的损耗。

2.绝缘：采用发泡PE或PE，信号传输速率达83%（PE为66%）。

3.屏蔽层：采用铝箔+镀锡铜线编织屏蔽。

4.护套：采用了环境适应性能优良的交联PE材料。

1. The inner conductor: the single core, bare copper and copper clad aluminium wire on the outside diameter of the same order core inner conductor have lower loss.

2. Insulation: use foam PE, signal transmission rate up to 83%.

3. Shield: the shielding layer with Tin-plated round copper wire weaving

4. Jacket: the environment to adapt to the good performance of the crosslinked PE material.

## 应用领域

### Application Field

适用于信息通信、电子对抗装备及地面基站、微波测试等系统。

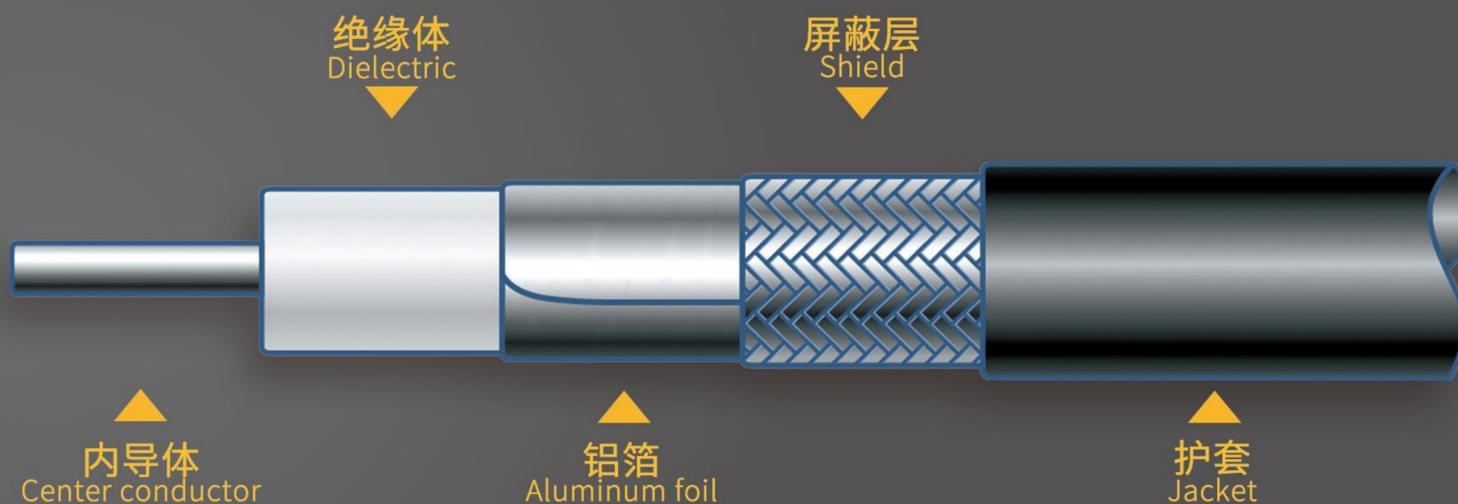
Applied to information and communication, electronic countermeasure equipment, ground stations, microwave test system, etc.

信息通信  
Information communication

电子对抗  
Electronic countermeasure

地面基站  
Ground base station

微波测试  
Microwave test system.



XYMR Series

## 结构参数与机械性能

### Structural parameters and mechanical properties

型号 Type	XYMR-100	XYMR-195	XYMR-200	XYMR-240
内导体外径 (mm) Center Conductor	0.46	0.94	1.12	1.42
导体形式 Center Conductor Type	单芯 Solid	单芯 Solid	单芯 Solid	单芯 Solid
绝缘外径 (mm) Insulation Diameter	1.52	2.79	2.95	3.81
外导体外径 (mm) Shields Diameter	2.11	3.53	3.66	4.52
总外径(mm) Jacket Diameter	≤2.79	≤4.95	≤4.95	≤6.10
最小弯曲半径(mm) Min.bending radius	14	26	26	35

## 电气与环境性能

型号 Type	XYMR-100		XYMR-195		XYMR-200		XYMR-240	
特性阻抗(ohms) Impedance	50		50		50		50	
电容(pf/m) Capacitance	101		80.4		80.4		80.4	
工作频率(GHz) Frequency Range	DC-5.8		DC-5.8		DC-5.8		DC-5.8	
传输速率 Velocity of Propagation	66%		80%		83%		85%	
最大工作电压 (kV) Max.Operating Voltage	0.8		1.2		1.2		15	
屏蔽效率 (dB@1GHz) Shielding Effectiveness	≥90		≥90		≥90		≥90	
频率Frequency	dB/m kW		dB/m kW		dB/m kW		dB/m kW	
30MHz	0.12	0.23	0.06	0.89	0.05	1.02	0.04	1.49
50MHz	0.16	0.18	0.08	0.68	0.07	0.79	0.05	1.15
150MHz	0.29	0.10	0.14	0.39	0.13	0.45	0.10	0.66
220MHz	0.35	0.08	0.17	0.32	0.15	0.37	0.12	0.54
450MHz	0.51	0.06	0.25	0.22	0.22	0.26	0.17	0.38
900MHz	0.74	0.05	0.36	0.15	0.32	0.18	0.24	0.26
1500MHz	0.98	0.04	0.47	0.12	0.42	0.14	0.32	0.20
1800MHz	1.10	0.03	0.52	0.11	0.46	0.13	0.35	0.18
2000MHz	1.16	0.02	0.55	0.10	0.49	0.12	0.37	0.17
2500MHz	1.31	0.01	0.62	0.09	0.55	0.10	0.42	0.15
5800MHz	2.17	0.01	0.93	0.06	0.86	0.07	0.66	0.10
使用温度范围 (°C) Temperature Range	-55~+85							

损耗 (+25°C室温)和功率 (+40°C室温, 海平面, 驻波1:1)

Insertion Loss (+25°C Ambient temperature) and Power (+40°C Ambient Temperature, Sea Level, VSWR1:1)

备注: 1.上表所列损耗值为未含连接器标称值, 连接器按 $2 \times 0.03 \sqrt{f}$ (GHz)计算

2.机械相位稳定性与测试方法密切相关, 如用其他方法测试, 数值可能发生变化。

1. The loss shown does not include the connector, the connector according to  $2 \times 0.03 \sqrt{f}$ (GHz) calculation.

2.Is closely related to the phase stability and mechanical testing methods, such as test with other methods, numerical might change.

## 结构参数与机械性能

### Structural parameters and mechanical properties

型号 Type	XYMR-300	XYMR-400	XYMR-500	XYMR-600
内导体外径 (mm) Center Conductor	1.78	2.74	3.61	4.47
导体形式 Center Conductor Type	单芯 Solid	单芯 Solid	单芯 Solid	单芯 Solid
绝缘外径 (mm) Insulation Diameter	4.83	7.24	9.40	11.56
外导体外径 (mm) Shields Diameter	5.72	8.13	10.29	12.50
总外径(mm) Jacket Diameter	≤7.62	≤10.29	≤12.70	≤14.99
最小弯曲半径(mm) Min.bending radius	41	55	65	80
<b>电气与环境性能      Electrical and Environmental Performance</b>				
特性阻抗(ohms) Impedance	50	50	50	50
电容(pf/m) Capacitance	80.4	78.4	76.8	76.8
工作频率(GHz) Frequency Range	DC-5.8	DC-5.8	DC-5.8	DC-5.8
传输速率 Velocity of Propagation	85%	85%	86%	85%
最大工作电压 (kV) Max.Operating Voltage	2.0	3.0	3.0	5.0
屏蔽效率 (dB@1GHz) Shielding Effectiveness	≥90	≥90	≥90	≥90
频率Frequency	dB/m      kW	dB/m      kW	dB/m      kW	dB/m      kW
30MHz	0.03      2.10	0.02      3.30	0.018      4.40	0.01      5.51
50MHz	0.04      1.60	0.03      2.60	0.02      3.40	0.02      4.24
150MHz	0.08      0.92	0.05      1.50	0.04      1.90	0.03      2.41
220MHz	0.09      0.76	0.06      1.20	0.05      1.60	0.04      1.97
450MHz	0.13      0.52	0.09      0.83	0.07      1.09	0.06      1.35
900MHz	0.20      0.36	0.13      0.58	0.10      0.75	0.08      0.93
1500MHz	0.26      0.28	0.17      0.44	0.13      0.57	0.11      0.70
1800MHz	0.28      0.25	0.19      0.40	0.15      0.52	0.12      0.63
2000MHz	0.30      0.24	0.20      0.37	0.16      0.49	0.13      0.59
2500MHz	0.34      0.21	0.22      0.33	0.18      0.43	0.15      0.52
5800MHz	0.54      0.13	0.35      0.21	0.29      0.26	0.24      0.32
使用温度范围 (°C) Temperature Range	-22~+185	-22~+185	-22~+185	-22~+185

损耗 (+25°C室温)和功率 (+40°C室温, 海平面, 驻波1:1)

Insertion Loss (+25°C Ambient temperature) and Power (+40°C Ambient Temperature, Sea Level, VSWR1:1)

## 产品介绍

### Product introduction

XFLL系列电缆采用了特殊的结构设计和生产工艺，使得电缆在全频段范围内有着优良的电气与机械性能指标，并具有很高的性价比。

电气性能方面，信号传输速率达70%或77%，还具有损耗低，驻波低，屏蔽效率高等特点。

机械性能方面，整体低密度PTFE绝缘和纵包铝箔加镀银铜线编织，使得电缆有更好的弯曲性和结构稳定性。

耐环境性方面，该电缆采用耐环境性能优秀的原材料，使其具有使用温度范围宽、抗腐蚀性、防霉防潮、阻燃等特点

XFLL series cable adopts Special Structure Design and production technology, which makes the cable have excellent electrical and mechanical performance in the whole frequency range, and have high performance-price ratio.

The electrical performance, the signal transmission rate of 70% or 77%,but also with low loss,low standing wave, high shielding efficiency.

In terms of mechanical properties,the solid core PTFE insulation and Longitudinal cladding aluminum foil with silver plated copper wire braids make the cable more flexible and structurally stable.

Environmental resistant,the cable using resistance to environmental performance excellent raw material, make its have use temperature scope wide,corrosion resistance, mouldproof moistureproof, flame retardant etc.

XFLL Series

## 经济型柔软低损耗同轴射频电缆

Economic flexible low loss coaxial RF cable

# XFLL

## 结构说明

### Construction Instruction

1.内导体：采用单芯。在相同外径的情况下单芯内导体有更低的损耗，在弯曲情况下有更好的机械相位稳定性；绞合导体较为柔软，有更好的弯曲性和弯曲疲劳使用寿命。

2.绝缘：采用PTFE或整体低密度PTFE，信号传输速率达70%或77%，整体绝缘结构能使电缆外径和绝缘介电常数稳定，保障了信号的稳定传输。

3.屏蔽层：采用纵包铝箔加镀银铜线编织的结构。纵包铝箔使屏蔽效率增加，高密度编织层是电缆的抗拉强度增加。

4.护套：采用了环境适应性能优越的FEP或PFA，是电缆具有较高的环境适应性。

1. The inner conductor: The single core. In the same order of outer diameter core inner conductor has lower loss,in bending cases have better mechanical phase stability; Stranded conductor is relatively soft, have better bending resistance and bending fatigue life.

2. Insulation: Adopt PTFE or overall low density PTFE, the signal transmission rate of 70% or 77%,the overall insulating structure can make the cable diameter and insulating dielectric constant stability,guarantee the stability of the signal transmission.

3. Shielding layer: Longitudinal aluminum foil plus silver-plated copper wire woven structure. The Longitudinal wrapped aluminum foil increases the shielding efficiency, and the high density braided layer increases the tensile strength of the cable.

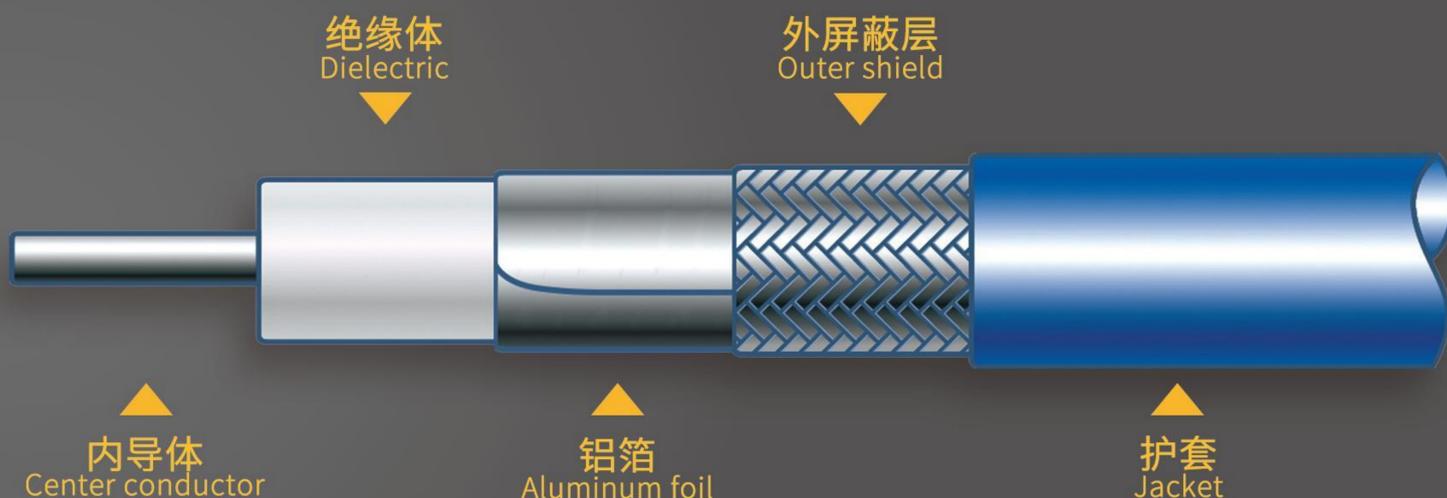
4. Jacket: using the environment to adapt to the superior performance of FEP or PFA,cable has high environmental adaptability.

## 应用领域

### Application Field

适用于对相位一致性有较高要求的整机系统，如：预警、制导、战术雷达和信息通信、电子对抗及遥感、卫星通信、微波测试等系统。

Application for the whole system with high requirements for phase consistency, such as early warning, guidance, tactical radar and information communication, electronic countermeasures and remote sensing, satellite communication, microwave test and so on.



XFLL Series

## 结构参数与机械性能

### Structural parameters and mechanical properties

型号 Type	XFLL-091	XFLL-130	XFLL-150	XFLL-216	XFLL-250	XFLL-315	XFLL-480
内导体外径 (mm) Center Conductor	0.52	0.72	0.93	1.45	1.78	2.30	3.80
导体形式 Center Conductor Type	单芯 Solid						
绝缘外径 (mm) Insulation Diameter	1.68	2.00	2.75	4.20	5.20	6.80	10.30
外导体外径 (mm) Shields Diameter	2.10	2.53	3.30	4.78	5.75	7.40	11.10
总外径(mm) Jacket Diameter	≤2.65	≤3.20	≤3.80	≤5.30	≤6.40	≤8.10	≤12.20
最小弯曲半径(mm) Min.bending radius	6.5	16	18	26	32	40	60

# 电气与环境性能

## Electrical and Environmental Performance

型号 Type	XFLL-091	XFLL-130	XFLL-150	XFLL-216	XFLL-250	XFLL-315	XFLL-480							
特性阻抗(ohms) Impedance	50	50	50	50	50	50	50							
电容(pf/m) Capacitance	96.2	88	88	88	88	88	82							
工作频率(GHz) Frequency Range	DC-40	DC-40	DC-40	DC-18	DC-18	DC-15	DC-15							
传输速率 Velocity of Propagation	70%	76%	76%	76%	76%	76%	76%							
最大工作电压 (kV) Max.Operating Voltage	0.8	1.0	1.2	1.5	1.5	2.0	2.0							
屏蔽效率 (dB@1GHz) Shielding Effectiveness	≥90	≥90	≥90	≥90	≥90	≥90	≥90							
损耗 Loss	dB/m kW		dB/m kW		dB/m kW		dB/m kW							
功率 power	dB/m kW		dB/m kW		dB/m kW		dB/m kW							
0.5GHz	0.49	0.154	0.36	0.266	0.29	0.366	0.17	1.098	0.15	1.453	0.10	2.409	0.07	4.374
1GHz	0.66	0.108	0.51	0.186	0.37	0.256	0.20	0.766	0.22	0.990	0.15	1.674	0.10	3.048
3GHz	1.20	0.060	0.88	0.104	0.65	0.145	0.43	0.428	0.38	0.574	0.27	0.926	0.18	1.698
4GHz	1.41	0.052	1.00	0.090	0.78	0.124	0.50	0.366	0.44	0.496	0.32	0.790	0.21	1.477
6GHz	1.75	0.041	1.23	0.072	0.96	0.100	0.62	0.293	0.55	0.396	0.40	0.629	0.27	1.161
8GHz	2.08	0.035	1.42	0.062	1.13	0.086	0.73	0.250	0.64	0.340	0.47	0.534	0.32	0.988
10GHz	2.37	0.031	1.60	0.054	1.28	0.076	0.83	0.220	0.72	0.302	0.54	0.469	0.36	0.870
12GHz	2.62	0.028	1.76	0.049	1.39	0.069	0.93	0.199	0.79	0.275	0.60	0.421	-	-
15GHz	3.0	0.025	1.97	0.043	1.58	0.061	1.04	0.174	0.90	0.242	0.70	0.360	-	-
18GHz	3.35	0.022	2.17	0.039	1.78	0.055	1.16	0.157	0.99	0.220	-	-	-	-
26.5GHz	4.32	0.018	2.66	0.032	2.35	0.044	-	-	-	-	-	-	-	-
40GHz	6.01	0.014	3.31	0.025	-	-	-	-	-	-	-	-	-	-
使用温度范围 (°C) Temperature Range	-65~+165		-65~+165		-65~+165		-65~+165		-65~+165		-65~+165		-65~+165	

损耗 (+25°C室温)和功率 (+40°C室温, 海平面, 驻波1:1)

Insertion Loss (+25°C Ambient temperature) and Power (+40°C Ambient Temperature, Sea Level, VSWR1:1)

备注: 1.上表所列损耗值为未含连接器标称值, 连接器按 $2 \times 0.03 \sqrt{f}$ (GHz)计算

2.机械相位稳定性与测试方法密切相关, 如用其他方法测试, 数值可能发生变化。

1. The loss shown does not include the connector, the connector according to  $2 \times 0.03 \sqrt{f}$ (GHz) calculation.

2.Is closely related to the phase stability and mechanical testing methods, such as test with other methods, numerical might change.



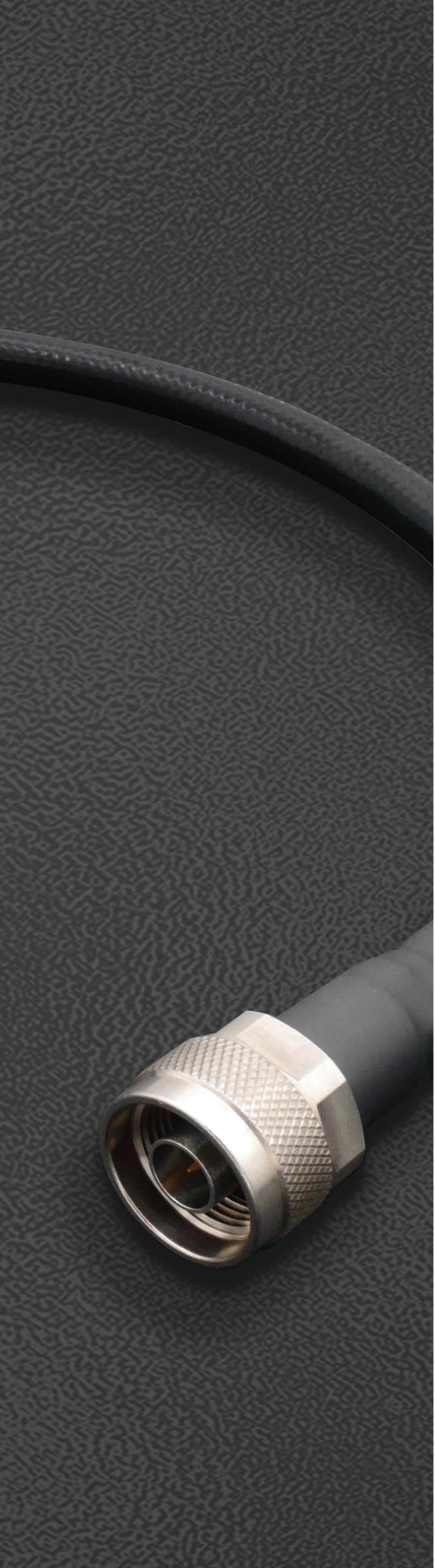
# 03

航空航天用超轻  
柔性低损耗电缆

Ultra flexible low loss  
for Aerospace

45-50





系列电缆是专为航空航天设计的一款轻量型射频稳相同轴电缆，具有重量轻，耐辐射性能优良，电气性能稳定等特点。

series cable is designed for the aerospace, a lightweight RF coaxial cable of the stationary phase, with light weight, good radiation resistance, stable electrical performance, etc.

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- XFWQ series

## 产品介绍

### Product introduction

XFWQ 系列电缆是专为航空航天设计的一款轻型低损耗同轴射频电缆，具有重量轻，耐辐射性能优良，电气性能稳定等特点。

机械性能方面，使该系列电缆具有重量轻（比铜普通型号同规格电缆降低25%~35%的重量）并拥有很好的柔韧性、机械相位稳定性与温度相位稳定性。

电气性能方面，信号传输速率83%，还具有损耗低，驻波低，屏蔽效率高等特点。耐环境性方面，该电缆采用耐环境性能优秀的原材料，使其具有较好的耐辐射性能（辐照剂量可达100K Gy），以及使用温度范围宽、抗腐蚀性、防霉防潮、阻燃等特点。

XFWQ series cable is a lightweight low loss coaxial RF cable designed for aerospace, with light weight, good radiation resistance, stable electrical performance, etc.

Mechanical performance, make the series cable with light weight (ordinary model with specification than copper cable to reduce the weight of 25% ~ 35%) and to have good flexibility, mechanical phase phase stability and temperature stability.

Electrical performance, signal transmission rate of 83%, but also has low loss, low standing wave ratio, high shielding efficiency etc. Environmental resistance, the cable is environmental performance excellent raw material, make it has good radiation resistance (100kGy irradiation dose can reach), and the use of wide temperature range, corrosion resistance, mouldproof moistureproof, flame retardant, etc. performance excellent raw material, make its have use temperature scope wide, corrosion resistance, mouldproof moistureproof, flame retardant characteristics.

XFWQ Series

航空航天用超轻柔性低损耗电缆  
Ultra light flexible low loss cables for  
or aerospace applications

# XFWQ

## 结构说明

### Construction Instruction

1. 内导体：单根镀银金属复合材料线。
2. 绝缘：采用微孔低密度PTFE，传输速率83%。
3. 屏蔽层：采用双屏蔽层结构，内屏蔽层采用镀银铜带绕包，外屏蔽采用镀银金属复合材料线编织。
4. 护套：采用了ETFE护套。

1. The inner conductor: Single silver plated metal composite wire.
2. Insulation: Adopt microporous low density PTFE, transmission rate of 83%
3. The shield: With double shielding layer structure, the shielding layer using silver plating copper strap bag, the outer shield is braided by silver - plated metal composite wire.
4. Sheath: adopted ETFE sheath.

## 应用领域

### Application Field

适用于各种射频信号传输的仪器、雷达等设备，特别是针对航天航空或对重量与耐辐射性要求较高的领域中。

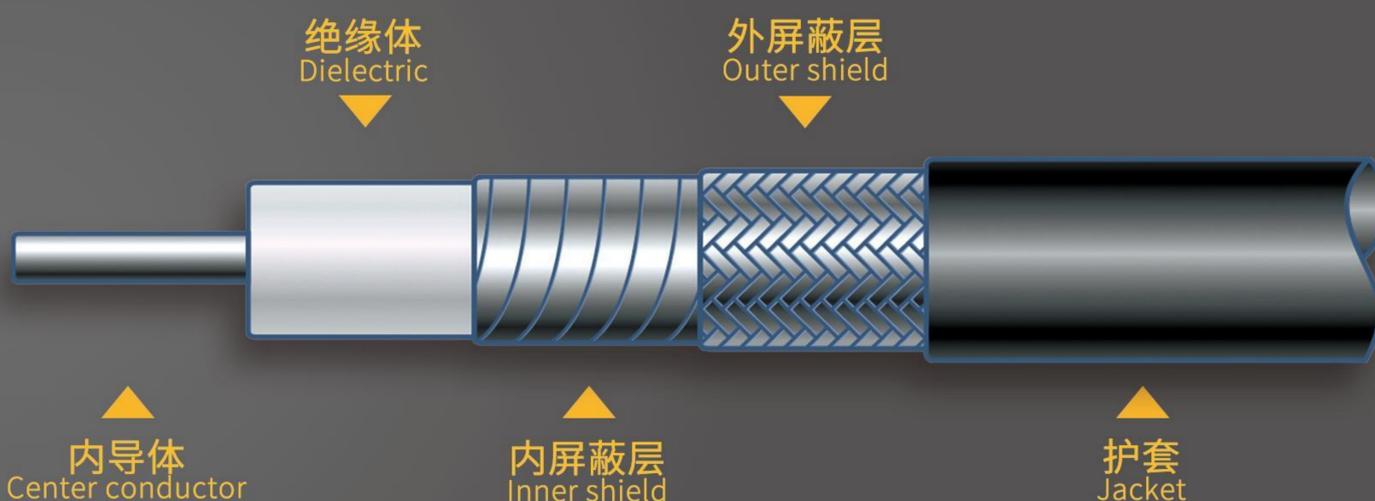
Suitable for all kinds of RF signal transmission equipment, radar and other equipment, especially for aerospace or weight and radiation resistance in the field of high demand.

航空航天  
AEROSPACE

遥感  
Emote sensing

卫星通信  
Satellite communications

微波测试  
Microwave test system.



XFWQ Series

## 结构参数与机械性能

### Structural parameters and mechanical properties

型号 Type	XFWQ-88	XFWQ-142	XFWQ-190	XFWQ-311
内导体外径 (mm) Center Conductor	0.51	0.91	1.40	2.30
导体形式 Center Conductor Type	单芯 Solid	单芯 Solid	单芯 Solid	单芯 Solid
绝缘外径 (mm) Insulation Diameter	1.40	2.50	3.85	6.30
外导体外径 (mm) Shields Diameter	1.80	3.05	4.40	7.10
总外径(mm) Jacket Diameter	≤2.15	≤3.55	≤4.80	≤7.80
最小弯曲半径(mm) Min.bending radius	11	18	26	40
重量 Weight (g/m)	11	23	42	85

# 电气与环境性能

## Electrical and Environmental Performance

型号 Type	XFWP-88Q		XFWP-142Q		XFWP-190Q		XFWP-311Q	
特性阻抗(ohms) Impedance	50		50		50		50	
电容(pf/m) Capacitance	85		83		83		83	
工作频率(GHz) Frequency Range	DC-67		DC-40		DC-26.5		DC-18	
传输速率 Velocity of Propagation	80%		82%		83%		83%	
最大工作电压 (kV) Max.Operating Voltage	0.8		1.2		1.3		3.0	
屏蔽效率 (dB@1GHz) Shielding Effectiveness	≥90		≥90		≥90		≥90	
频率Frequency	dB/m	kW	dB/m	kW	dB/m	kW	dB/m	kW
0.5GHz	0.44	0.131	0.26	0.703	0.19	1.310	0.11	2.564
1GHz	0.63	0.092	0.36	0.495	0.26	0.921	0.16	1.804
3GHz	1.10	0.053	0.61	0.283	0.44	0.524	0.27	1.028
4GHz	1.28	0.045	0.70	0.244	0.51	0.451	0.31	0.886
6GHz	1.58	0.037	0.86	0.199	0.63	0.365	0.38	0.718
8GHz	1.84	0.032	0.99	0.171	0.73	0.314	0.44	0.618
10GHz	2.07	0.028	1.10	0.152	0.81	0.279	0.50	0.549
12GHz	2.28	0.026	1.24	0.139	0.88	0.253	0.55	0.499
15GHz	2.57	0.023	1.36	0.123	0.99	0.225	0.61	0.443
18GHz	2.84	0.021	1.58	0.112	1.08	0.204	0.65	0.402
26.5GHz	3.50	0.017	2.09	0.091	1.35	0.165	-	-
40GHz	4.39	0.013	2.64	0.073	-	-	-	-
50GHz	4.97	0.012	-	-	-	-	-	-
60GHz	5.87	0.010	-	-	-	-	-	-



# 04

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## SFT系列同轴射频电缆

SFT series  
coaxial RF cable

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51-56





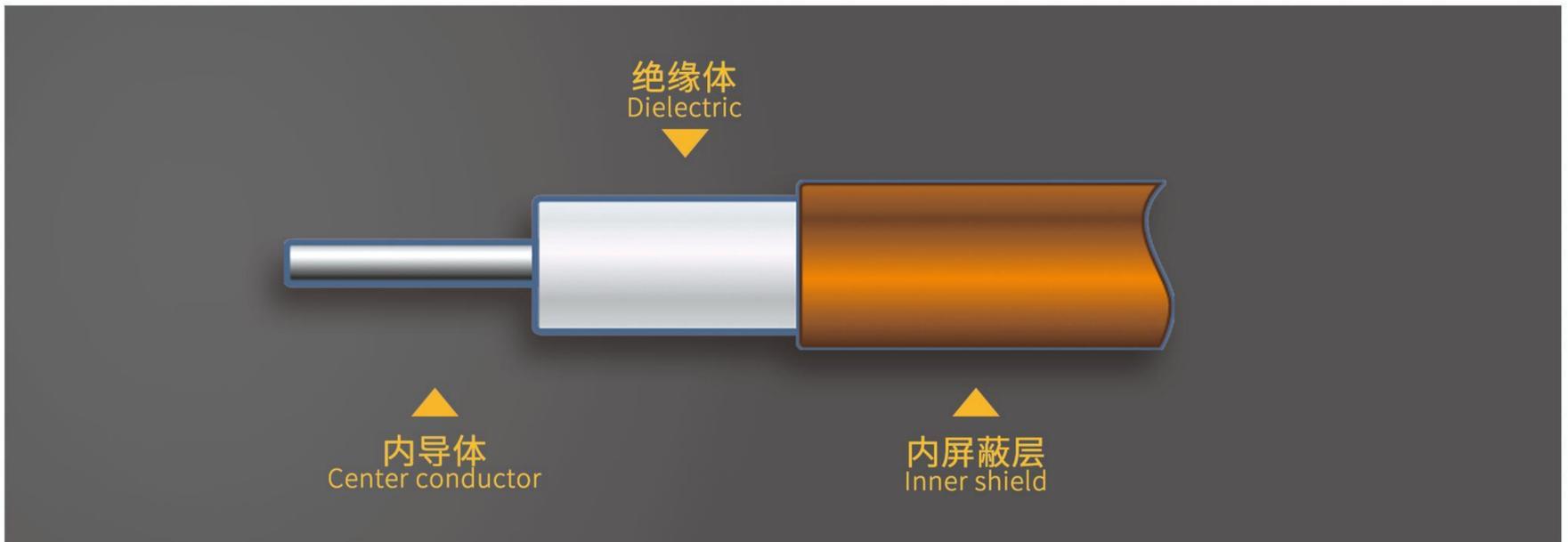
SFT系列为半钢电缆，其外导体为无缝紫铜管或铝管结构。由于屏蔽层为全封闭结构，所以电缆具有最优的屏蔽性能和最小的外导体损耗，较高的使用频段范围和在全频段内较好的电性能指标。

SFT series is semi steel cable, its outer conductor is seamless copper tube or aluminum tube structure. Because the shielding layer is totally enclosed structure, the cable has the best shielding performance and minimum outer conductor loss, higher frequency range and better electrical performance index in the whole frequency band.

- 
- SFT series
  - SFT-LS series

## SFT系列半刚同轴射频电缆

SFT series Semi rigid coaxial RF cable



## 产品介绍

Product introduction

SFT系列为半钢电缆，其外导体为无缝紫铜管或三元合金管结构。由于屏蔽层为全封闭结构，所以电缆具有最优的屏蔽性能和最小的外导体损耗，较高的使用频段范围和在全频段内较好的电性能指标。特性阻抗有50Ω、75Ω、10Ω、25Ω等。电气性能方面，使用频率高，电压驻波比小，屏蔽效率高。机械性能方面，具有较强的抗拉强度和弯曲固定成形性，但在使用过程中应防止弯曲半径过小和二次弯曲造成外导体损伤耐环境性方面，电缆的环境适应性很强，一般会根据具体的使用环境进行不同的镀层保护。

# SFT

The SFT series of steel cables, the outer conductor is seamless copper tube or ternary alloy tube structure. Due to the shield .Is fully enclosed structure, so the cable has a optimal shielding performance and minimal outer conductor loss, the use of higher frequencies .And good performance index within the full frequency range. Characteristic impedance of 50 Ω, 75 Ω, 10 Ω, 25 Ω and so on.

Electrical performance, the use of high frequency, voltage standing wave ratio is small, high shielding efficiency.

Mechanical performance, strong tensile strength and bending formability, but in use process should prevent bending .Radius is too small and the second curved outer conductor damage

Environmental resistance, cable environment adaptability is very strong, usually according to the specific use environment of different plating Layer of protection.

## 结构说明

Construction Instruction

- 1、内导体：单根镀银铜线或单根镀银铜包钢线。
- 2、绝缘层：采用实心PTFE，传输速率：70%左右；
- 3、外导体：采用无缝紫铜管或三元合金管结构。全封闭的屏蔽层结构，使得电缆具有最优的屏蔽性能和最小的外导体损耗，较高的使用频段范围和在全频段内较好的电性能指标。

1. The inner conductor: single copper wire or silver plated single silver plated copper clad steel wire.

2. Insulation: Adopt solid PTFE, transmission rate: 70%.

3.The outer conductor: using seamless copper tube or ternary alloy tube structure. Totally enclosed shielding layer structure, make the cable with the best shielding performance and minimal outer conductor loss of the use of high frequency range and good electric performance indicators within the full frequency.

## 应用领域

### Application Field

主要应用于对各种需要进行射频信号传输的仪器设备中。

Mainly used in the equipment which need the RF signal transmission.

## 结构参数与机械性能

### Structural parameters and mechanical properties

型号 Type	SFT-50-0.6	SFT-50-1	SFT-50-2	SFT-50-3	SFT-50-5.2
内导体外径 Center Conductor Diameter (mm)	0.20	0.29	0.53	0.92	1.63
导体形式 Center Conductor Type	单芯 Solid	单芯 Solid	单芯 Solid	单芯 Solid	单芯 Solid
绝缘外径 Insulation Diameter (mm)	0.66	0.94	1.68	2.98	5.25
外导体外径 Shields Diameter (mm)	0.86	1.19	2.20	3.58	6.35
最小弯曲半径 Min.bending radius(mm)	4	5	10	15	30

## 电气与环境性能

### Electrical and Environmental Performance

型号 Type	SFT-50-0.6	SFT-50-1	SFT-50-2	SFT-50-3	SFT-50-5	
特性阻抗 Impedance(ohms)	50	50	50	50	50	
电容 Capacitance(pf/m)	98	98	98	98	98	
工作频率 Frequency Range(GHz)	DC-20	DC-20	DC-20	DC-20	DC-10	
传输速率 Velocity of Propagation	70%	70%	70%	70%	70%	
最大工作电压 Max.Operating Voltage(kV)	1.0	2.0	2.5	3.0	6.0	
屏蔽效率 Shielding Effectiveness (dB@1GHz)	≥100	≥100	≥100	≥100	≥100	
损耗 Loss	dB/m		dB/m		dB/m	
功率 power	kW		kW		kW	
0.5GHz	1.12	0.79	0.45	0.26	0.16	
1GHz	1.59	1.13	0.64	0.38	0.23	
5GHz	3.62	2.59	1.51	0.91	0.58	
10GHz	5.20	3.74	2.22	1.37	0.89	
20GHz	7.52	5.44	3.29	2.09	-	
使用温度范围 Temperature Range (°C)	-55~+125	-55~+125	-55~+125	-55~+125	-55~+125	

损耗 (+25°C室温)和功率 (+40°C室温, 海平面, 驻波1:1)

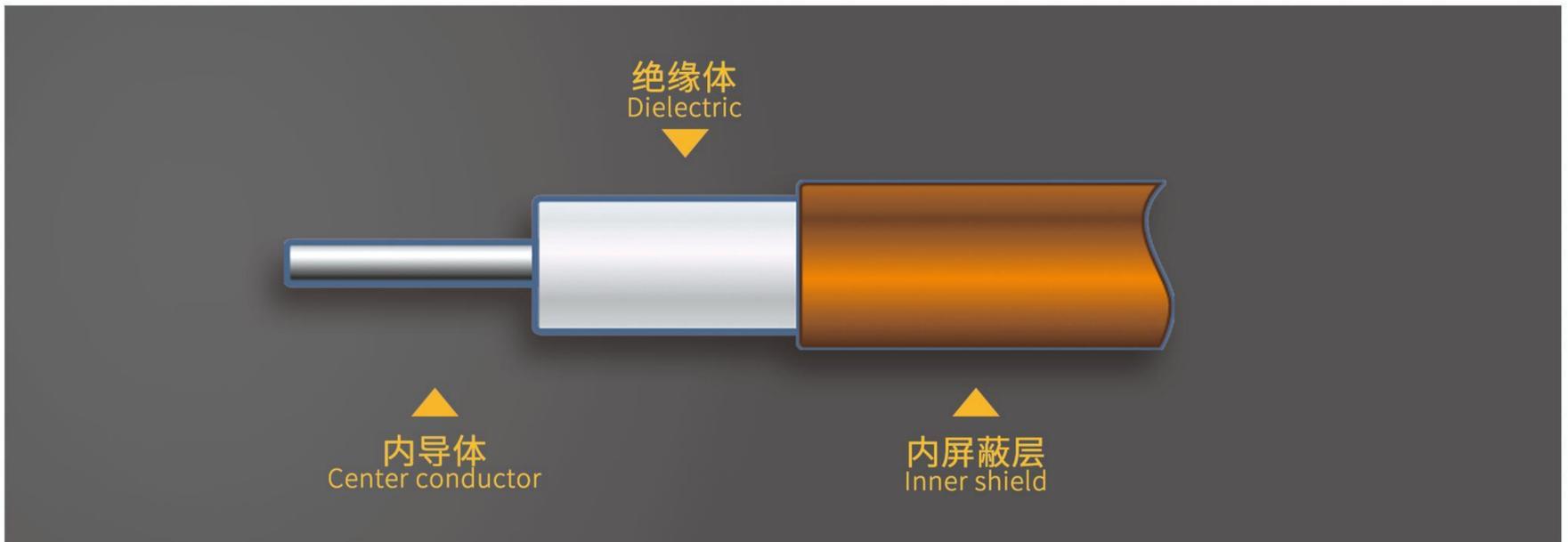
Insertion Loss (+25°C Ambient temperature) and Power (+40°C Ambient Temperature, Sea Level, VSWR1:1)

备注: 1.上表所列损耗值为未含连接器标称值, 连接器按 $2 \times 0.03\sqrt{f}$ (GHz)计算

1.The loss shown does not include the connector, the connector according to  $2 \times 0.03\sqrt{f}$ (GHz) calculation

## SFT-LP系列半刚同轴射频电缆

SFT series Semi rigid coaxial RF cable



### 产品介绍

Product introduction

SFT-LP系列为低损耗半钢电缆，其外导体为无缝紫铜管或三元合金管结构。由于屏蔽层为全封闭结构，所以电缆具有最优的屏蔽性能和最小的外导体损耗，较高的使用频段范围和在全频段内较好的电性能指标。特性阻抗有50Ω、75Ω、10Ω、25Ω等。电气性能方面，使用频率高，损耗值比SFT系列小，电压驻波比小，屏蔽效率高。机械性能方面，具有较强的抗拉强度和弯曲固定成形性，但在使用过程中应防止弯曲半径过小和二次弯曲造成外导体损伤。耐环境性方面，电缆的环境适应性很强，一般会根据具体的使用环境进行不同的镀层保护。

# SFT-LP

The SFT series of low loss steel cables, the outer conductor is seamless copper tube or ternary alloy tube structure. Due to the shield .Is fully enclosed structure, so the cable has a optimal shielding performance and minimal outer conductor loss, the use of higher frequencies .And good performance index within the full frequency range. Characteristic impedance of 50 Ω, 75 Ω, 10 Ω, 25 Ω and so on. Electrical performance, the use of high frequency, Loss value is smaller than the SFT series, voltage standing wave ratio is small, high shielding efficiency. Mechanical performance, strong tensile strength and bending formability, but in use process should prevent bending .Radius is too small and the second curved outer conductor damage Environmental resistance, cable environment adaptability is very strong, usually according to the specific use environment of different plating Layer of protection. The SFT series of steel cables, the outer conductor is seamless copper tube and aluminum tube structure. Due to the shield .Is fully enclosed structure, so the cable has a optimal shielding performance and minimal outer conductor loss, the use of higher frequencies .And good performance index within the full frequency range. Characteristic impedance of 50 Ω, 75 Ω, 10 Ω, 25 Ω and so on. Electrical performance, the use of high frequency, voltage standing wave ratio is small, high shielding efficiency. Mechanical performance, strong tensile strength and bending formability, but in use process should prevent bending .Radius is too small and the second curved outer conductor damage Environmental resistance, cable environment adaptability is very strong, usually according to the specific use environment of different plating Layer of protection.

### 结构说明

Construction Instruction

- 1、内导体：单根镀银铜线或单根镀银铜包钢线。
- 2、绝缘层：采用整体低密度PTFE，传输速率：77%左右；
- 3、外导体：采用无缝紫铜管或三元合金管结构。全封闭的屏蔽层结构，使得电缆具有最优的屏蔽性能和最小的外导体损耗，较高的使用频段范围和在全频段内较好的电性能指标。

1. The inner conductor: single copper wire or silver plated single silver plated copper clad steel wire.
2. Insulation: Adopt overall low density insulation , Velocity of propagation: 77%.
3. The outer conductor: using seamless copper tube and aluminum tube structure. Totally enclosed shielding layer structure, make the cable with the best shielding performance and minimal outer conductor loss of the use of high frequency range and good electric performance indicators within the full frequency.

## 应用领域

### Application Field

主要应用于对各种需要进行射频信号传输的仪器设备中。

Mainly used in the equipment which need the RF signal transmission.

## 结构参数与机械性能

### Structural parameters and mechanical properties

型号 Type	SFT-034-LP	SFT-047-LP	SFT-086-LP	SFT-120-LP	SFT-141-LP	SFT-250-LP
内导体外径 Center Conductor Diameter (mm)	0.22	0.32	0.57	0.915	1.03	1.78
导体形式 Center Conductor Type	单芯 Solid					
绝缘外径 Insulation Diameter (mm)	0.66	0.94	1.68	2.70	2.98	5.25
外导体外径 Shields Diameter (mm)	0.86	1.19	2.20	3.05	3.60	6.35
最小弯曲半径 Min.bending radius(mm)	4	5	10	15	18	30

## 电气与环境性能

### Electrical and Environmental Performance

型号 Type	SFT-034-LP	SFT-047-LP	SFT-086-LP	SFT-120-LP	SFT-141-LP	SFT-250-LP
特性阻抗 Impedance(ohms)	50	50	50	50	50	50
电容 Capacitance(pf/m)	88	88	88	88	88	88
工作频率 Frequency Range(GHz)	DC-67	DC-67	DC-50	DC-40	DC-26.5	DC-18
传输速率 Velocity of Propagation	77%	77%	77%	77%	77%	77%
最大工作电压 Max.Operating Voltage(kv)	1.0	1.0	1.0	1.2	1.5	2.0
屏蔽效率 Shielding Effectiveness(dB@1GHz)	≥100	≥100	≥100	≥100	≥100	≥100
频率Frequency	dB/m kW	dB/m kW	dB/m kW	dB/m kW	dB/m kW	dB/m kW
1GHz	1.43 0.012	1.01 0.024	0.57 0.072	0.36 0.148	0.33 0.189	0.19 0.473
5GHz	3.23 0.005	2.30 0.011	1.31 0.031	0.84 0.064	0.77 0.081	0.47 0.196
10GHz	4.61 0.004	3.29 0.007	1.90 0.022	1.23 0.044	1.13 0.056	0.70 0.132
18GHz	6.24 0.003	4.47 0.005	2.61 0.016	1.71 0.032	1.58 0.040	1.00 0.093
26.5GHz	7.64 0.002	5.49 0.004	3.23 0.013	2.14 0.025	1.98 0.032	- -
40GHz	9.48 0.002	6.84 0.004	4.06 0.010	2.73 0.020	- -	- -
50GHz	10.67 0.002	7.72 0.003	4.61 0.009	- -	- -	- -
67GHz	12.48 0.001	9.06 0.002	- -	- -	- -	- -
使用温度范围 Temperature Range (°C)	-55~+125	-55~+125	-55~+125	-55~+125	-55~+125	-55~+125

损耗 (+25°C室温)和功率 (+40°C室温, 海平面, 驻波1:1)

Insertion Loss (+25°C Ambient temperature) and Power (+40°C Ambient Temperature, Sea Level, VSWR1:1)

备注: 1.上表所列损耗值为未含连接器标称值, 连接器按 $2 \times 0.03\sqrt{f}$ (GHz)计算

1.The loss shown does not include the connector, the connector according to  $2 \times 0.03\sqrt{f}$ (GHz) calculation

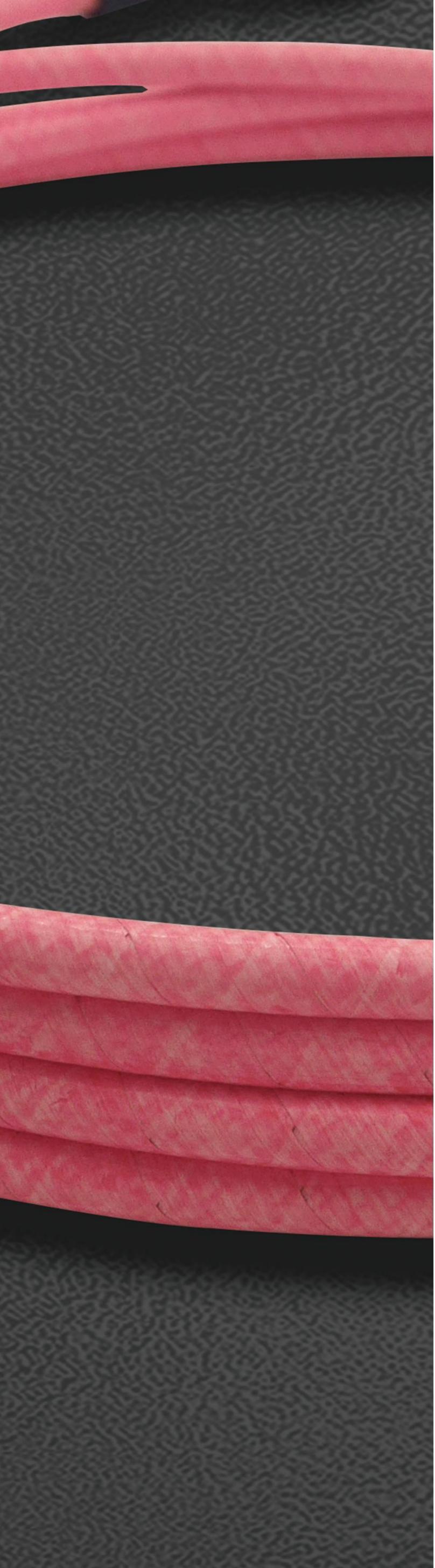
# 05

## 技术支持

Technical support

57-68





实验过程及报告

Experiment process and report

- 
- 回波损耗与驻波比
  - 相位稳定性测试方法
  - 衰减振动稳定性
  - 同轴电缆额定平均功率
  - 改善网络分析仪的插入损耗测量精度

Return Loss and VSWR table

Phase stability test method

Damped vibration stability

Rated average power of coaxial cable

Improving insertion loss measurement  
accuracy of network analyzer

# 公式

## Formula

特性阻抗 (ohms) Impedance	$Z_c = \frac{60}{\sqrt{\epsilon}} \ln \frac{D}{d} = \frac{138}{\sqrt{\epsilon}} \lg \frac{D}{d} \quad (\Omega)$	延时与长度 And the length of delay	$T = 3.33\sqrt{\epsilon} \quad (\text{ns/m})$ $L = \frac{0.3T}{\sqrt{\epsilon}} \quad (\text{m})$
衰减 Attenuation	$\partial_{\text{总}} = \partial_R + \partial_G \quad (\text{dB/km})$ $\partial_R = \frac{2.61 \times 10^{-3} \sqrt{f\epsilon}}{\lg \frac{D}{d}} \left( \frac{1}{d} + \frac{1}{D} \right)$ $\alpha_G = 9.1 \times 10^{-5} f \sqrt{\epsilon} \cdot \text{tg} \delta$	速率 Rate	$V_p = \frac{1}{\sqrt{\epsilon}} \times 100 \quad (\%)$
电容 (pf/m) Capacitance	$C = \frac{24.12\epsilon}{\lg \frac{D}{d}} \quad (\text{pF/m})$	截止频率 Cut-off frequency	$F_{\infty} = \frac{1.91 \times 10^5}{\sqrt{\epsilon}(D+d)} \quad (\text{MHz})$

回波损耗与驻波比对照表 Return Loss and VSWR table

反射系数 (ρ) Reflection coefficient	回波损耗 (RL) Return Loss	驻波比 (SWR) VSWR
1.00	0.00	∞
0.90	0.92	19.00
0.80	0.94	9.00
0.70	3.10	5.67
0.60	4.44	4.00
0.50	6.02	3.00
0.40	7.96	2.33
0.30	10.46	1.86
0.20	13.98	1.50
0.10	20.00	1.22
0.09	20.92	1.20
0.08	21.94	1.17
0.07	23.10	1.15
0.06	24.44	1.13
0.05	26.02	1.11
0.04	27.96	1.08
0.03	30.46	1.06
0.02	33.98	1.04
0.01	40.00	1.02
0.00	∞	1.00

$$\rho = (\text{SWR}-1) / (\text{SWR}+1)$$

$$\text{RL} = -20 \lg(\rho)$$

$$\text{SWR} = (1+\rho) / (1-\rho)$$

复反射系数:  $\Gamma = (Z_L - Z_0) / (Z_L + Z_0) = \rho (\sin \theta + j \cos \theta)$

# 相位稳定性测试方法

## Phase stability test method

### A. 1 温度相位稳定性

#### A. 1.1 概述

电缆由于环境温度的变化引起机械长度及介电常数的变化，从而产生相位变化。电缆的温度相位变化是温度的函数，温度相位稳定性可以用相位温度变化系数  $\eta_T$  表示与最大相位变化系数  $|\Delta\eta|_{\max}$  评定。

相位温度变化系数  $\eta_T$  为在规定的频率下，各规定温度点电缆相位值相对室温  $t_0$  (通常为 25 °C) 相位值的变量 (= -) 与室温相位之比，并以  $1 \times 10^{-6}$  为 1 个单位：

$$\eta_T = (\Delta\Phi_t / \Phi_{t_0}) \times 10^6 |\Delta\eta| \text{ ----- (A. 1)}$$

最大相位变化系数  $|\Delta\eta|_{\max}$  为在试验温度范围内，“ $\eta_T - T$ ”曲线图中最大值  $\eta_{\max}$  和最小值  $\eta_{\min}$  的绝对差值：

$$|\Delta\eta| = |\eta_{\max} - \eta_{\min}| \text{ ----- (A. 2)}$$

#### A. 1.2 试验设备

试验设备包括矢量网络分析仪、温度试验箱。

#### A. 1.3 试验步骤

试验步骤如下：

- 1) 试样长度为 6 m ~ 10 m，两端应配接适配的连接器；
- 2) 测试电缆试样在常温 (25 °C) 下，规定频率点的相位；
- 3) 为了  $\eta_T - T$  曲线可重复性稳定，试样需做多个温度循环；
- 4) 电缆试样置温度试验箱内温度均一区域，连接器两端伸出箱体段长不大于 0.3 米。在试验温度范围内，从最低温开始升温至最高温，每次升温不大于 5 °C，并记录每次升温温度稳定后的电缆相位；
- 5) 按公式 A. 1 计算  $\eta_T$ ，并作出  $\eta_T - T$  曲线图 (见 A. 1 示例图)；
- 6) 确定曲线图中的最大值  $\eta_{\max}$  和最小值  $\eta_{\min}$ ，并按公式 A. 2 计算电缆在该温度范围内的最大相位变化系数

$$|\Delta\eta|_{\max}$$

#### A. 1.4 试验报告

试验报告应包含以下内容：

- 试样长度；
- 测试频率；
- 试验温度范围；
- 循环次数；
- $\eta_T - T$  曲线图；
- 最大相位变化系数  $|\Delta\eta|_{\max}$ 。

### A. 1 temperature phase stability

#### A. 1.1 Overview

Cable due to environmental temperature changes cause changes in the mechanical length and the dielectric constant, resulting in phase change. Phase change temperature of the cable is a function of temperature, the temperature of the phase of phase stability can  $\eta_T$  represents the temperature coefficient of the maximum phase variation coefficient  $|\Delta\eta|_{\max}$  Assessment.

Temperature coefficient of  $\eta_T$  phase at a predetermined frequency for each point of a predetermined temperature value of the relative phase of the cable temperature  $t_0$  (typically 25 °C) variable phase value (= -) ratio of the phase of a room temperature, and  $1 \times 10^{-6}$  to one unit:

$$\eta_T = (\Delta\Phi_t / \Phi_{t_0}) \times 10^6 |\Delta\eta| \text{ ----- (A. 1)}$$

The maximum phase variation coefficient  $|\Delta\eta|_{\max}$  To be within the test temperature range, " $\eta_T - T$ "  $\eta_{\max}$  maximum graph and the  $\eta_{\min}$  imum absolute difference  $\eta_{\min}$ :

$$|\Delta\eta| = |\eta_{\max} - \eta_{\min}| \text{ ----- (A. 2)}$$

#### A.1.2 Test Equipment

Test equipment including vector network analyzers, temperature chambers.

#### A.1.3 Test procedure

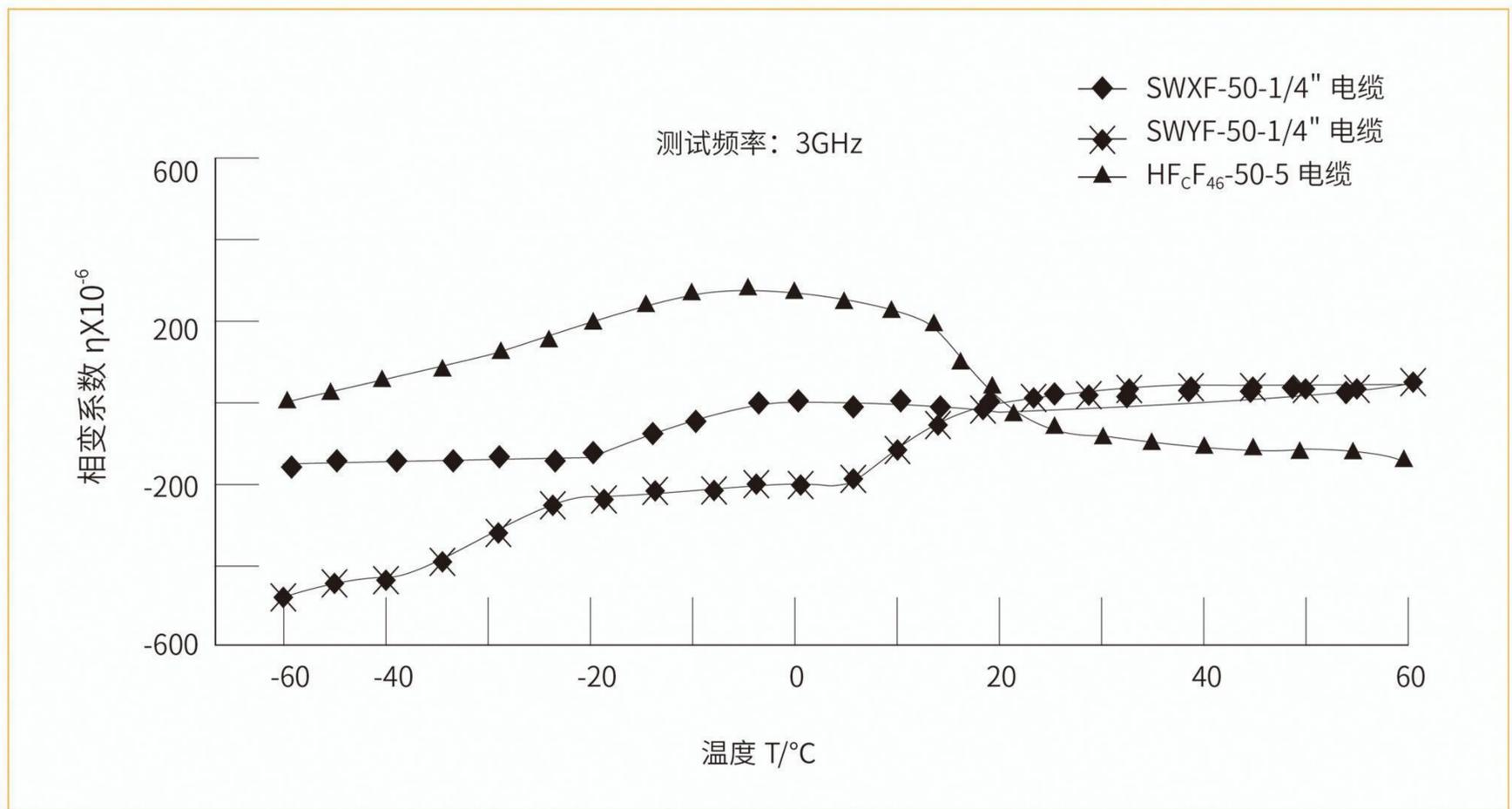
The test procedure is as follows:

- 1) The sample length is 6 m ~ 10 m, the ends should be connected with the adapter connector;
- 2) Test cable specimens at room temperature (25 °C), the phase of a predetermined frequency points;
- 3) In order to stabilize the reproducibility  $\eta_T - T$  curve, the samples to be done to a plurality of temperature cycles;
- 4) Cable sample set temperature test chamber temperature uniformity region, extending both ends of the connector box segment grow to 0.3 meters. Within the test temperature range from low temperature to warm up to the maximum temperature, each temperature of not more than 5 °C, and records the phase of each cable stable temperature after heating;
- 5) Calculated according to the formula A.1  $\eta_T$ , and make  $\eta_T - T$  graph (see the example in Figure A.1);
- 6) Determine the maximum  $\eta_{\max}$  graph and minimum  $\eta_{\min}$ , then the formula A.2 cable maximum phase variation coefficient calculated within the temperature range  $|\Delta\eta|_{\max}$ .

#### A.1.4 Test Report

The test report shall contain the following:

- Sample length;
- Test frequency;
- Test temperature range;
- Cycles;
- $\eta_T - T$  graph;
- Maximum phase variation coefficient max.



## A. 2 弯曲相位稳定性

### A.2.1 概述

弯曲相位稳定性为在规定的频率下，电缆弯曲时产生的相位变化。其数值大小表示电缆结构机械稳定性，试验值与试验频率、弯曲圆盘直径、弯曲角（弯曲圈数）、试样长度等试验条件密切相关。

### A.2.2 试验设备

试验设备包括矢量网络分析仪、弯曲圆盘。

### A.2.3 试验步骤

试验步骤如下：

- 1) 试样长度大于 3 m，两端应配接适配的连接器；
- 2) 测试电缆试样在常温（25 °C）下，规定频率点的相位并校准为“零”；
- 3) 电缆按详细规范规定的直径和弯曲角进行弯曲，如图 A.2 所示；
- 4) 记录各弯曲状态时相位变化量 $|\Delta\Phi_t|$ ；
- 5) 弯曲时，电缆非弯曲部位应处于静止状态，尤其是与矢量网络分析仪接口部位。

## A. 2 bending phase stability

### A.2.1 Overview

Bending phase stability at a predetermined frequency to produce a phase change of the cable bend. Its value indicates the size of the cable structure mechanical stability test with the test frequency, bending disc diameter, bend angle (bending laps), is closely related to the sample length test conditions.

### A.2.2 Test Equipment

Test equipment including vector network analyzer, bend the disc.

### A.2.3 Test procedure

The test procedure is as follows:

- 1) The sample length is greater than 3 m, the ends should be connected with the adapter connector;
- 2) Test cable samples at room temperature (25°C), the provisions of frequency and phase calibration for "zero";
- 3) Press the detailed specification cable diameter and bending angle bend, as shown in Figure A.2;
- 4) The amount of the phase change recording bent state  $|\Delta\Phi_t|$ ;
- 5) When bending, bending parts of the cable should be in the non-stationary state, especially with the vector network analyzer interface site.

#### A.2.4 试验报告

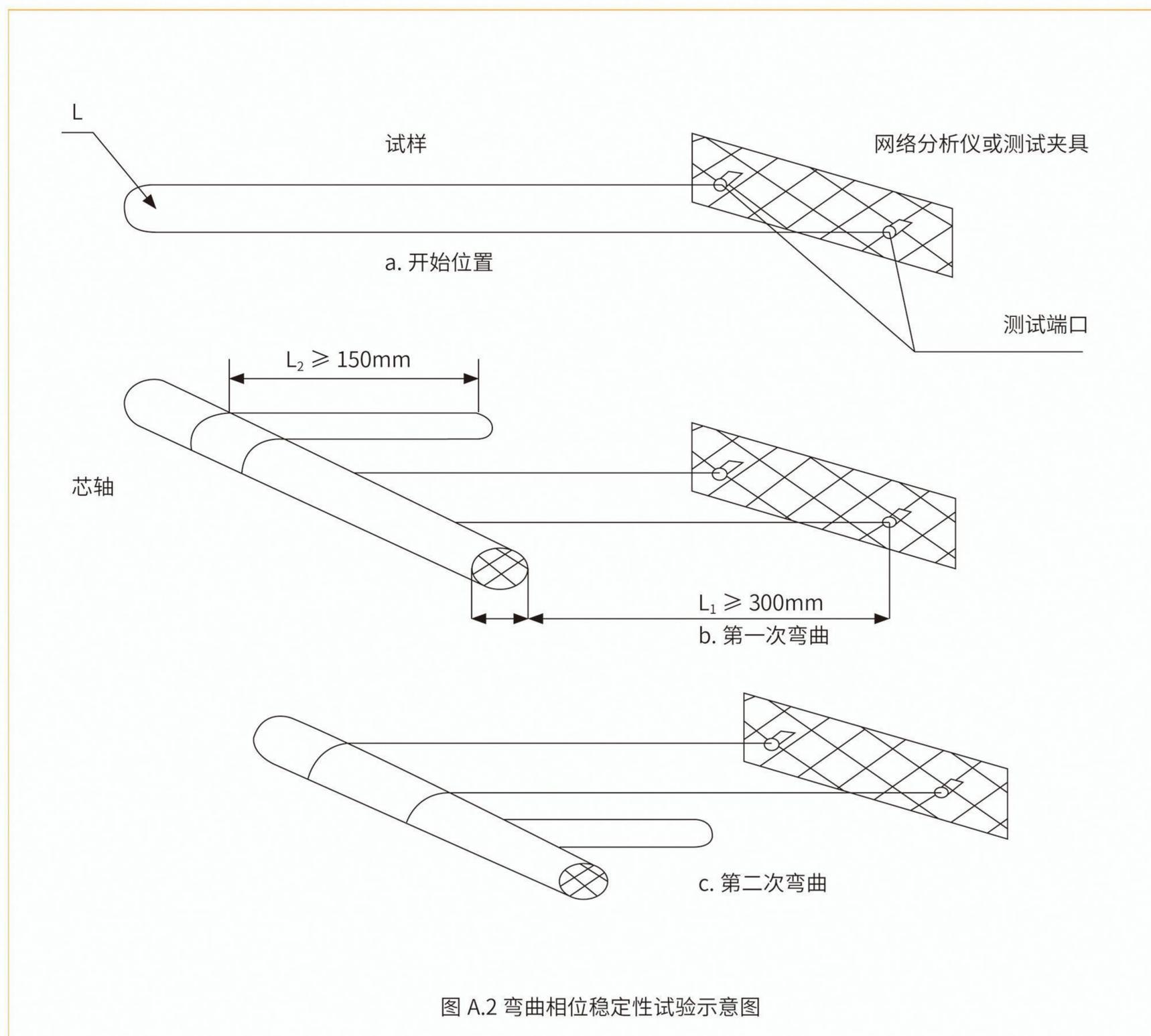
试验报告应包含以下内容：

- 试样长度；
- 测试频率；
- 试验弯曲圆盘直径；
- 弯曲角；
- 各弯曲状态时弯曲相位变化量 $|\Delta\Phi_t|$ 。

#### A.2.4 Test Report

The test report shall contain the following:

- Sample length;
- Test frequency;
- Bending test disc diameter;
- Bending angle;
- Bending phase change amount each bent state $|\Delta\Phi_t|$ .



## 衰减震动稳定性

## Attenuate Vibration Stability

### 1. 试样的制备

测试样品选用电缆长度  $L=2000\pm 20\text{mm}$ ，两段装接符合 GJB681A-2002 及相关详细规范要求的 SMA-50J 连接器插头。

### 2. 试验设备

振动台：最小振动频率 1Hz，振动位移幅值  $\geq 0.5\text{mm}$ 。  
如果无专业振动台，可按试验要求手工或台具进行模拟振动。  
矢量网络分析仪：足够精度、准确度和频率范围的矢量网络分析仪。

### 3. 试验环境

试验环境温度变化范围应保持在  $\pm 2^\circ\text{C}$  以内。

### 4. 试验系统的组装

试验前，电缆应无支撑的成圈，成圈直径不小于 200mm，将电缆组件安装在指定夹具上置于振动台上，通过测试线连接到矢量网络分析仪上，网络分析仪扫描频点 801 点，避免测试线和连接部位受到振动影响。

### 5. 测量振动前衰减

按 3.5.7 方法测试组件衰减，按要求频率点测试衰减 值。

### 6. 测量振动时变化最大的衰减 值：振动频率 2Hz，振动位移幅值 $\leq 20\text{mm}$ ，振动时间 30s，监测振动过程中规定频率的衰减最大值。

### 7. 计算衰减振动稳定值： $|\Delta\partial| = |\partial_{\text{max}} - \partial_0|$

### 1. Specimen preparation

Test samples were selected cable length  $L = 2000 \pm 20\text{mm}$ , two attachment meets GJB681A-2002 and the related detailed specification requirements SMA-50J connector plug.

### 2. Test Equipment

Vibration table: minimum vibration frequency 1Hz, vibration displacement amplitude  $\geq 0.5\text{mm}$ . If there is no professional shaking table, according to test requirements with manual or Taiwan to simulate vibration.  
Vector Network Analyzer: sufficient precision, accuracy and frequency range of vector network analyzer.

### 3. Test environment

Test the ambient temperature changes should be maintained within  $\pm 2^\circ\text{C}$ .

### 4. Assembly 4 test system

Before the test, the cable should be no support of a circle, a circle diameter of not less than 200mm, the cable assembly is mounted on the vibration table designated fixture placed, connected to a vector network analyzer through the test line, network analyzers scanning frequency 801 points, avoid testing line and connecting parts affected by vibration.

### 5. Measuring vibration damping ago 3.5.7 The method according to test components decay, according to the requirements of the test frequency attenuation value.

### 6. Measuring vibration changes the maximum attenuation values: vibration frequency 2Hz, vibration displacement amplitude $\leq 20\text{mm}$ , vibration time 30s, the process of monitoring the vibration attenuation specified maximum frequency.

### 7. Calculate the stable value of attenuated vibration:

$$|\Delta\partial| = |\partial_{\text{max}} - \partial_0|$$

## 同轴电缆额定平均功率

Rated average power of coaxial cable

同轴电缆的允许传输额定平均功率代表电缆可以长期安全运行而不发生热损坏所能承受的平均输入功率值，其主要受到以下因素限制：

- 电缆的自身产生发热的热流源—衰减；
- 绝缘介质的耐高温能力；
- 电缆的自身散热能力—热阻；
- 敷设条件、环境温度等。

The allowable transmission average power of coaxial cable represents the average input power that the cable can operate safely for a long time without thermal damage. It is mainly limited by the following factors:

- The heat source of the cable which produces heat itself - attenuation;
- The high temperature resistance of insulating medium;
- The thermal resistance of the cable;
- Laying conditions, ambient temperature, etc.

## 电缆的发热

Heating of cable

电缆传输一定的功率时，其内部有三个热源组成：

内导体发热  $W_d = I^2 R_d = 2Pa_d$

外导体发热  $W_D = I^2 R_D = 2Pa_D$

介质发热  $W_G = U^2 G = 2Pa_G$

式中  $a_d = R_d / 2ZC$  — 内导体电阻引起的衰减

$a_D = R_D / 2ZC$  — 外导体电阻引起的衰减

$a_G = 1/2GZC$  — 介质衰减

$R_d$ 、 $R_D$  — 分别为内、外导体的电阻

$P$  — 平均功率

$W_d$ 、 $W_D$ 、 $W_G$  — 分别为上述衰减分量所引起的热流分量。

When the cable transmits a certain power, there are three heat sources in it:

Heating of inner conductor

$W_d = I^2 R_d = 2Pa_d$

Heating of outer conductor

$W_D = I^2 R_D = 2Pa_D$

Medium heating

$W_G = U^2 G = 2Pa_G$

In  $a_d = R_d / 2ZC$  — Attenuation caused by resistance of inner conductor

$a_D = R_D / 2ZC$  — Attenuation caused by resistance of outer conductor

$a_G = 1/2GZC$  — Dielectric attenuation

$R_d$ 、 $R_D$  — The resistance of inner and outer conductor respectively

$P$  — Average power

$W_d$ 、 $W_D$ 、 $W_G$  — They are the heat flux component caused by the attenuation component.

## 电缆的散热

### Cable heat dissipation

电缆的散热能力可以用所谓“热阻”来表示，热阻表示电缆散热时受到的阻碍，如图所示，当电缆内导体向周围环境散热时，热流要经过绝缘的热阻 $S_d$ ，护套的热阻 $S_c$ 以及护套表面向周围环境散热的热阻 $S_0$ ，当然热流还会遇到内、外导体金属的热阻，由于金属是良好的导热体，其热阻可忽略不计。

The heat dissipation capacity of the cable can be expressed as the so-called "thermal resistance". The thermal resistance indicates the resistance of the cable when it is cooled. As shown in the figure, when the inner conductor of the cable is radiating to the surrounding environment, the heat flow shall pass through the insulation thermal resistance  $S_d$ , the thermal resistance  $S_c$  of the sheath and the thermal resistance  $S_0$  of the sheath surface to the surrounding environment. Of course, the heat flow will encounter the thermal resistance of the inner and outer conductor metal, Because metal is a good heat conducting body, its thermal resistance can be ignored.

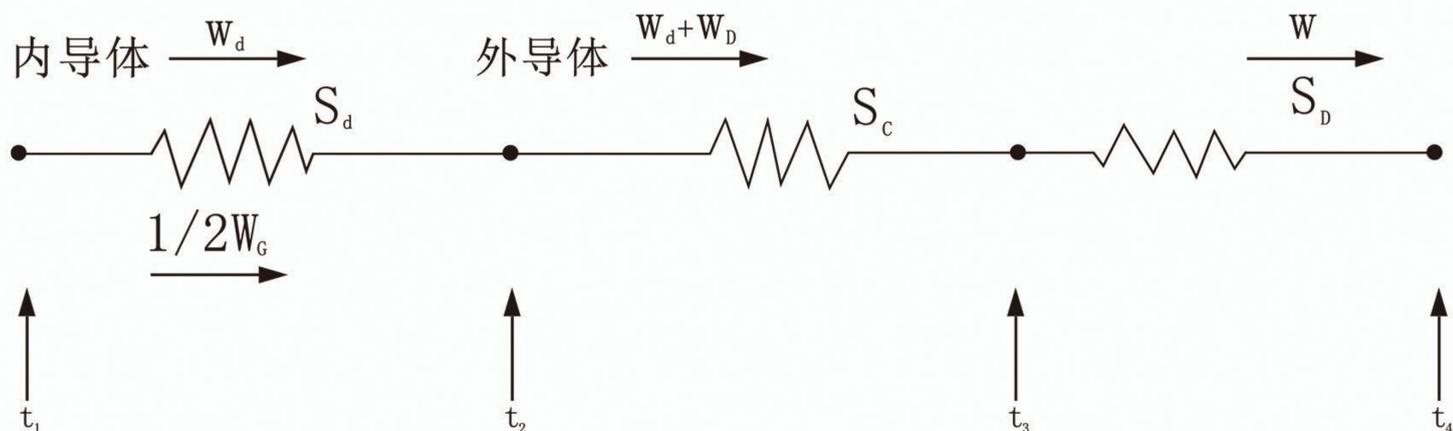


图1 同轴电缆的等效热路图

绝缘和护套的热阻 $S_d$ 、 $S_c$ 可按下式计

算：

$$S_d = \frac{G_d}{2\pi} \ln \frac{D}{K_{1d}} = 0.3665 G_d I_g \frac{D}{K_{1d}} \text{热欧厘米}$$

$$S_c = \frac{G_c}{2\pi} \ln \frac{D_0}{D_1} = 0.3665 G_c I_g \frac{D_0}{D_1} \text{热欧厘米}$$

式中 $D$ 、 $d$ 为绝缘层的外、内径（毫米）

$D_0$ 、 $D_1$ 为护套层的外、内径（毫米）

$K_1$ 为绞线内导体的等效直径系数（见表1）

)

$G_d$ 、 $G_c$ 分别为绝缘介质和护套材料的热阻率（热偶厘米），可由表2选取。

The thermal resistance  $S_d$  and  $S_c$  of insulation and sheath can be calculated as follows:

$$S_d = \frac{G_d}{2\pi} \ln \frac{D}{K_{1d}} = 0.3665 G_d I_g \frac{D}{K_{1d}}$$

$$S_c = \frac{G_c}{2\pi} \ln \frac{D_0}{D_1} = 0.3665 G_c I_g \frac{D_0}{D_1}$$

In the above formula,

$D$ 、 $d$  is the outer and inner diameter of the insulating layer (mm).

$D_0$ 、 $D_1$  is the outer and inner diameter of sheath (mm).

$K_1$  is the equivalent diameter coefficient of conductor in stranded wire (see Table 1).

$G_d$ 、 $G_c$  They are the thermal resistances (thermocouple cm) of insulating medium and sheath material respectively, which can be selected from table 2.

对于埋地敷设：

$$S_0 = \frac{G_g}{2\pi} \ln \frac{4L}{D_0} = 0.3665 G_g I_g \frac{4L}{D_0} \text{热欧厘米}$$

式中：G<sub>g</sub>为土壤的热阻率，L为电缆的埋地深度，D<sub>0</sub>为电缆的外径。

对于架空敷设：

$$S_0 = \frac{1}{\pi D_0 K_h \theta_0^{\frac{1}{4}}} \text{热欧厘米}$$

式中θ<sub>0</sub>=t<sub>3</sub>-t<sub>0</sub>表示电缆表面与周围环境的温差（°C）

K<sub>h</sub> - 电缆表面的散热系数（瓦/厘米<sup>2</sup>·°C）

D<sub>0</sub> - 电缆外径（应该用厘米代入）

For buried laying:

$$S_0 = \frac{G_g}{2\pi} \ln \frac{4L}{D_0} = 0.3665 G_g I_g \frac{4L}{D_0}$$

In the above formula, G<sub>g</sub> is the thermal resistance of the soil, L is the buried depth of the cable, and D<sub>0</sub> is the outer diameter of the cable.

For overhead laying:

$$S_0 = \frac{1}{\pi D_0 K_h \theta_0^{\frac{1}{4}}}$$

In the above formula, θ<sub>0</sub>=t<sub>3</sub>-t<sub>0</sub> indicates the temperature difference between the cable surface and the surrounding environment (°C)

K<sub>h</sub> - heat dissipation coefficient of cable surface (watt / cm<sup>2</sup> · °C)

D<sub>0</sub> - cable outer diameter (should be replaced in cm)

表1 绞线内导体的有效直径系数 Table 1 effective diameter coefficient of inner conductor of stranded wire

绞线内导体的导线根数N Number of conductors in stranded conductor(N)	1	3	7	12	19	27
有效直径系数K1 Effective diameter coefficient (K1)	1.000	0.871	0.939	0.957	0.970	0.976
绞线内导体的导线根数N Number of conductors in stranded conductor(N)	37	50	70	90	-	-
有效直径系数K1 Effective diameter coefficient (K1)	0.980	0.983	0.986	0.988	-	-

表2 常规材料的热阻率 Table 2 thermal resistance of conventional materials

材料 Material	热阻率（热欧厘米） Thermal resistance
聚乙烯 polyethylene	350-450
聚氯乙烯 polyvinyl chloride	700
聚四氟乙烯 pteflon	500
微孔聚四氟乙烯 Microporous polytetrafluoroethylene	900
泡沫聚乙烯 Foamed polyethylene	900
聚苯乙烯 polystyrene	750
氯丁橡胶 Chloroprene rubber	500
涂沥青的棉麻 Pitch coated cotton and hemp	500
土壤 soil	120
干燥电缆纸 Drying cable paper	1000
静止空气 Still air	4100

由图1可见额定功率的计算公式

$$t_1 - t_2 = (W_d + 1/2W_G) S_d = (\alpha_d + 1/2\alpha_G) 2PS_d$$

$$t_2 - t_3 = WS_c = 2PaS_c$$

$$t_3 - t_0 = WS_0 = 2PaS_0$$

相加之后可得：

$$t_1 - t_0 = 2PS_d(\alpha_d + 1/2\alpha_G) + 2Pa(S_c + S_0)$$

$$\text{因此 } P = \frac{t_1 - t_0}{(2\alpha_d + \alpha_G)S_d + 2a(S_c + S_0)}$$

式中 $t_1 - t_0$ 表示允许的内导体最高温度 $t_1$ 与环境温度 $t_0$ 之差，通常是预先规定的耐温等级。

在使用上式时，如果是架空敷设，则热阻 $S_0$ 中包含着未知数 $\theta_0$ ，而电缆内导体与护套表面之间温差为：

$\theta' = t_1 - t_3$  它与总热流 $W$ 之间有如下线性关系：

$$\theta' = S_d W_{\text{绝}} + S_c W \left( \frac{\alpha_d + \frac{1}{2}\alpha_G}{\alpha} S_d + S_c \right) W$$

将温升曲线 $\theta_0$ 和 $\theta'$ 相互迭加即可确定允许的热流值 $W_{\text{允}}$ （迭加的方法见图3），则额定功率即可求出如下：

$$P = \frac{W_{\text{允}}}{2a}$$

式中 $\alpha$ 应该用电缆在工作温度下的衰减值代入。

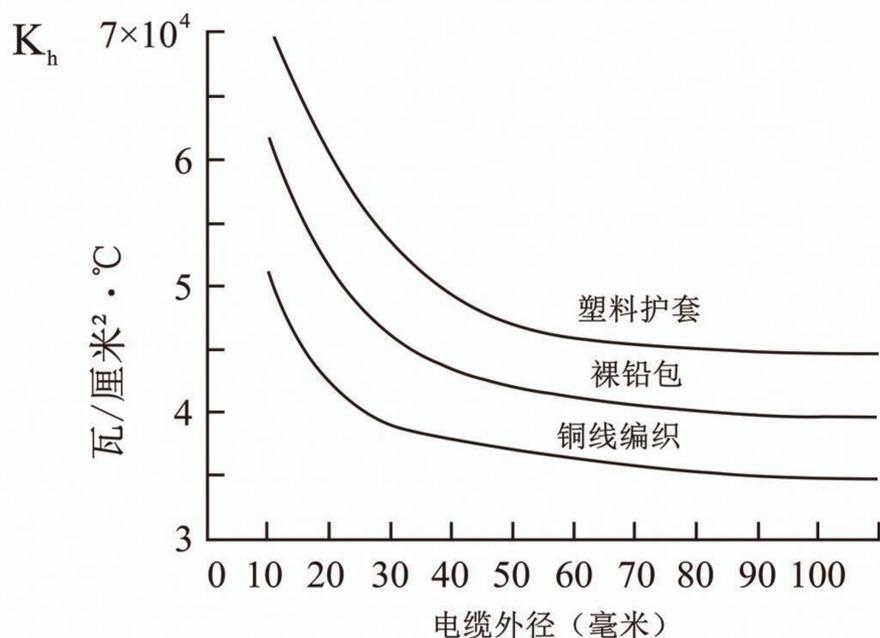


图2 电缆的表面散热系数

The calculation formula of rated power can be seen from Figure 1:

$$t_1 - t_2 = (W_d + 1/2W_G) S_d = (\alpha_d + 1/2\alpha_G) 2PS_d$$

$$t_2 - t_3 = WS_c = 2PaS_c$$

$$t_3 - t_0 = WS_0 = 2PaS_0$$

After adding, we can get:

$$t_1 - t_0 = 2PS_d(\alpha_d + 1/2\alpha_G) + 2Pa(S_c + S_0)$$

$$\text{So } P = \frac{t_1 - t_0}{(2\alpha_d + \alpha_G)S_d + 2a(S_c + S_0)}$$

$t_1 - t_0$  refers to the difference between the maximum allowable temperature  $T_1$  of the inner conductor and the ambient temperature  $T_0$ , which is usually the pre-determined temperature resistance level.

When using the above formula, if it is overhead laying, the thermal resistance  $S_0$  contains unknowns  $\theta_0$ , and the temperature difference between the inner conductor and the sheath surface is:

$\theta' =$  The linear relationship between  $T_1 - T_3$  and total heat flux  $W$  is as follows

Temperature rise curve  $\theta_0$  and  $\theta'$  The allowable heat flow value  $W$  is determined by superposition (see Fig. 3 for the superposition method), then the rated power can be calculated as follows:

$$P = \frac{W_{\text{允}}}{2a}$$

$\alpha$  should be replaced by the attenuation value of the cable at the working temperature.

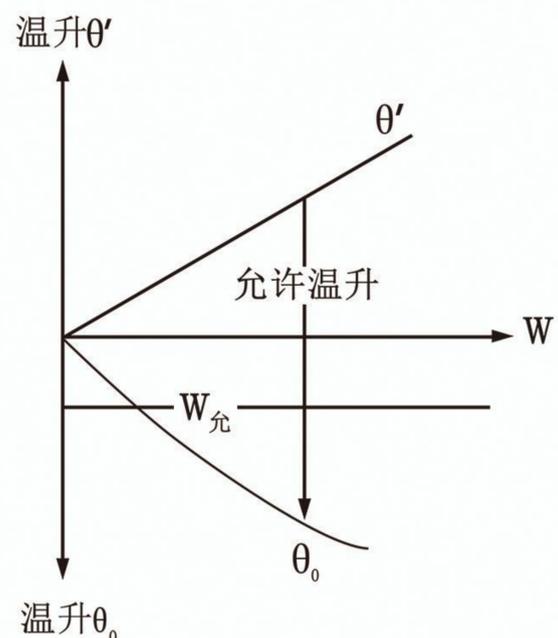


图3 图解法求得允许热流

## 改善网络分析仪的插入损耗测量精度

在用网络分析仪测量无源器件(尤其是低损耗的器件如电缆组件, 空气线等)的插入损耗时, 在通路上插入固定衰减器可以提高测量精度。

在测试通路中插入两个6dB(或10dB)衰减器, 在通路中校准时, 将这两个衰减器作为测试电缆的一部分进行校准, 使测试通路的插入损耗归一化到0dB, 然后接入DUT进行测试。从图1的测试结果可以发现, 当不加衰减器时, DUT的插入损耗曲线存在波动; 而加入衰减器后(图2), 曲线变得平滑。是因为由于衰减器的存在改善了测试通路的失配损耗。

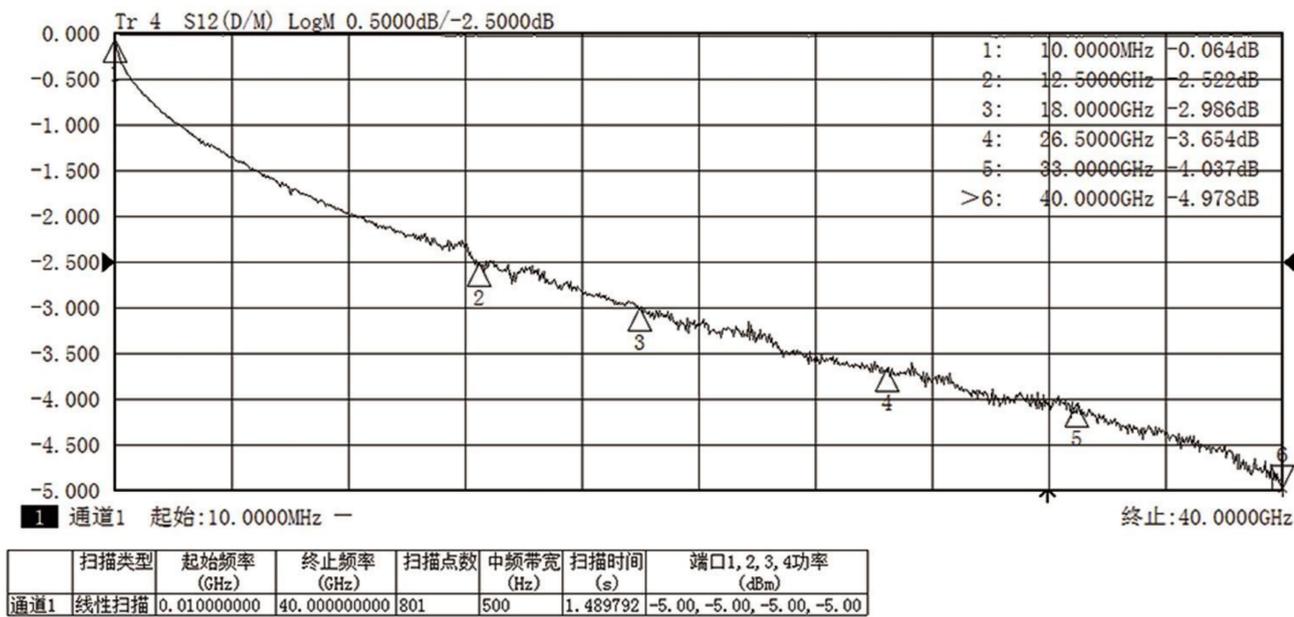


图1 不加衰减器时的插入损耗测试结果

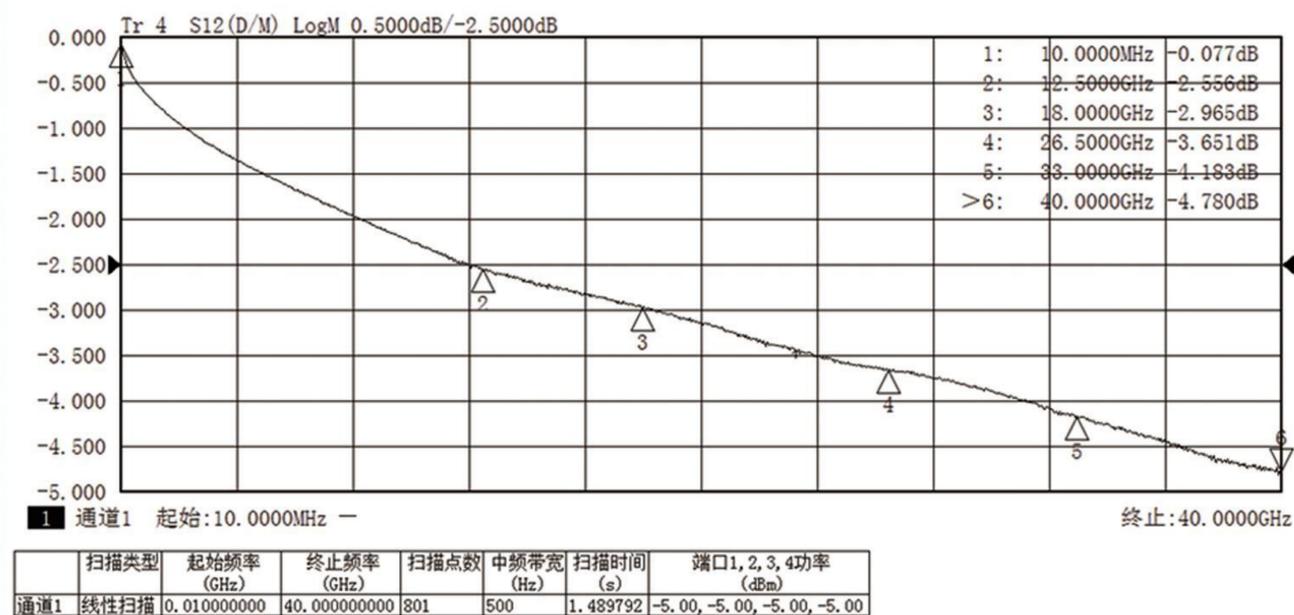


图2 加衰减器后的插入损耗测试结果

用于上述用途的衰减器, 并不需要十分平坦的衰减量频率相应, 因为在通路校准时, 这些频响误差都被校准了, 但衰减器的VSWR则越低越好。



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