Custom RF Cable Assemblies

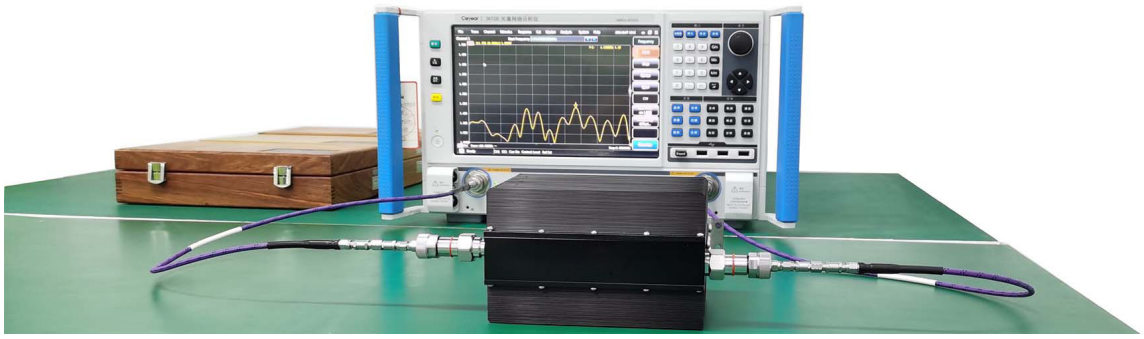
CATALOG

2025

About Us

“RF-Coaxial” is an **ISO 9001** certified supplier of high quality RF, Microwave and mmWave components & cable assemblies from China. Since 2022 we have been dedicated to the design and manufacturing of RF attenuators, terminations and other passive components. As the industry evolved, “RF-Coaxial” has grown and expanded our lines to keep meeting customer needs. Our products are used widely in commercial, industrial and military applications including wireless, satellite, defense, test & measurement etc.

“RF-Coaxial” has been continuously pursuing improvement and dedicating to product innovation, granted with 13 patents in the range of RF Attenuators, mmWave terminations, low PIM Passive Components etc.



Main categories include:

- Coaxial Fixed Attenuator/Termination (DC-4GHz through 67GHz, 2W-2kW)
- DC Block (9kHz up to 67GHz)
- mmWave Coax Adapter/Connector(Up to 110GHz)
- Low PIM Component (170dBc termination/attenuator/cable/adapter)
- Waveguide Product (adapter/attenuator/termination/coupler)
- Power Divider
- Flexible Cable Assembly (Up to 110GHz)

Introduction of Custom RF Cable Assemblies

"RF-Coaxial" offers a complete line of high performance microwave flexible cables up to 110 GHz, with a variety of options in cable size, flexibility, loss and affordability. Benefiting from over twenty-year experience in designing and manufacturing cables & connectors, we provide highly reliable cable assemblies widely used in test & measurement, high frequency inter-connection, 5G system as well as in harsh enviroments such as defense, naval etc. Cables and assemblies are produced in-house, every cable assembly is tested for insertion loss, VSWR and shipped with an individual test plot.

Features and Benefits

- Versatile cable selections in different flexibility, loss and affordability
- Low loss cables available to 18, 26.5, 40, 50, 67, 110 GHz
- Proven phase stability vs. temperature and flexure
- Precise phase match available
- Various ruggedized armor and connector options
- Competitive price and very quick delivery
- Custom designs available

Testing and Inspections

"RF-Coaxial" performs below inspections and tests for cable and cable assemblies.

Acceptance Testing		Qualification Testing
Test Items	**Inspection Rate**	**Test Items**
Insertion loss	100%	Minimum Static Bend Radius
VSWR	100%	Minimum Dynamic Bend Radius
Amplitude vs.Shaking	100%	Flex life
Connector Interface	100%	Connector Retention
Assembly Marking	100%	Coupling Mechanisim Proof Torque
Assembly Length	100%	Insertion loss vs. Temperature
Workmanship	100%	Phase Stability vs. Temperature
Cable Diameter	100%	Phase Change vs. Bending
Cable Weight	Sampling each lot	Thermal Shock
Velocity of Propagation	Sampling each lot	Vibration
Dielectric Withstanding Voltage	Sampling each lot	Cold Bend
Characteristic Impedance	Sampling each lot	Salt Spray
Tensile Strength and Elongation	Sampling each lot	Stress Crack Resistance
Center Conductor Adhesion	Sampling each lot	Aging Stability

Notes:
1. Phase Stability test for phase stable cables only.
2. Other enviromental or electrical tests can be performed when required.

Production and Test Facilities

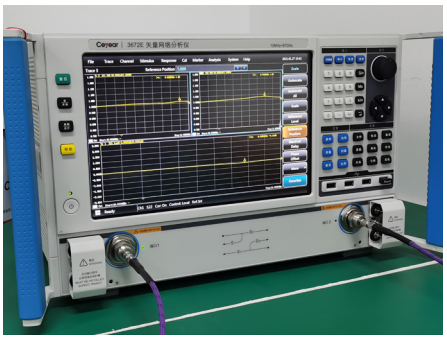
"RF-Coaxial" is committed to providing high quality and reliable products to our worldwide customers. Our ISO 9001 certified facilities are equipped with a range of production equipments and test instruments.

Cable Production

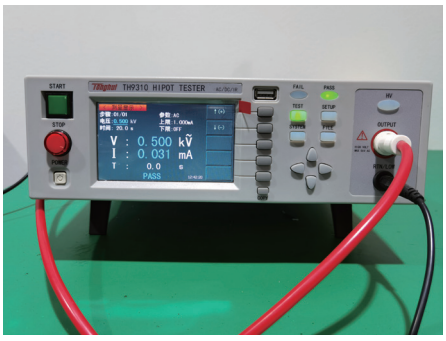
Cable Assembly Shop

Warehouse

Enviromental Test



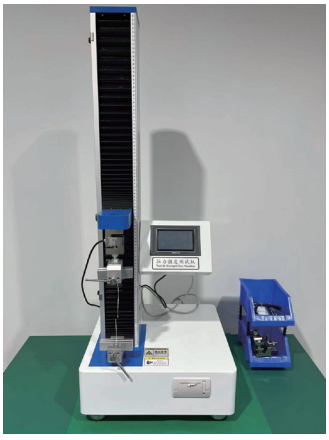
Vector Network Analyzer



HIPOT Tester

Time Domain Reflectometry

Flex Life Tester



Tensile Strength Tester

Thermal Shock Test Chamber

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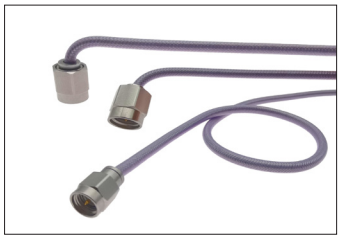
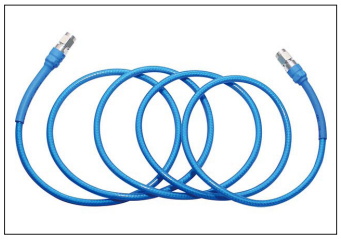
Series of custom rf cable assemblies

- Minimal phase and attenuation change versus flexure
- Ultra-low loss & VSWR, up to 110 GHz
- Robust and reliable, ruggedized armors available
- Broad options in frequency, cable size, connector

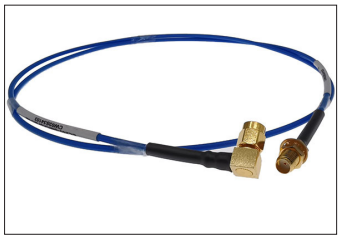
- Long flex life, ideal as test or interconnect cables
- Triple shielding with superior shielding effectiveness
- Torque resistant and high pull off strength
- Low loss and good amplitude stability with flexure



- Flexible alternatives to semi-rigid cables
- Allowing multiple times of bending from connector end
- Eliminating use of right angle connectors
- Small bending radius, ideal for high density interconnect



- Ultra-flexible with stranded inner conductor
- Excellent phase stability over to 40GHz
- Durable design, long flex life
- Ruggedized armors available



- Superior flexible alternative to semi-flexible cables
- Up to 67 GHz, available in 047, 086 and 141 sizes
- Highly competitive pricing, from stock
- Lower loss than equivalent hand-formable cables

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Selection Guide

In order to simplify the cable selection process, we have classified these flexible cables into different series and further rated them by loss, flexibility, phase stability etc.

Cable Series Designation	Part Number	Max Operation Freq(GHz)	Super Flexibility	Low Loss	Phase Stability vs. Flex	Phase Stability vs.Temp	High Power	Low Profile	High Mechanical Strength with multi-shielding	Addtional Remarks
Ultra-Low Loss Phase and Amplitude Stable RPL Series	RPL180	110	★★★	★★	★★	★		★★★		Precision Test or high end inter-connect
	RPL220	67	★★	★★	★★	★★		★★		
	RPL230P	67	★★	★★	★★★	★		★★	★★	
	RPL360P	50		★★	★★★	★			★★	
	RPL360	40		★★★	★★	★★				
	RPL380P	40		★★★★	★★★	★★			★★	
	RPL390P	40		★★★	★★★	★★			★★	
	RPL520	26.5		★★★	★★★	★★				
	RPL520P	26.5		★★★	★★★	★★			★★	
	RPL800	18		★★★	★★★	★★	★★			
	RPL1200	10		★★★	★★★	★★	★★★			
Long Flex Life Triple-Shielding RFL Series	RFL460	26.5		★★	★				★★★	General Purpose Test or interconnect
	RFL520	18		★★	★				★★★	
	RFL620	18		★★	★		★		★★★	
Low cost flexible alternative to semi-flexible RSP Series	RSP160	67	★★★					★★★		Interconnect use
	RSP280	40	★					★		
	RSP400	18								
Tight Bend Replacing Semi-rigid RMB Series	RMB200	40	★★		★			★★	★★★	Super small bending radius, bend-to-end
	RMB250	40	★★		★	★		★	★★★	
	RMB250L	40	★★		★	★		★	★★★	
	RMB260L	50	★★		★★			★	★★★	
	RMB360	26.5	★		★				★★★	
Ultra-Flexible Phase Stable Low Loss RUF Series	RUF360	40	★★★	★★	★★★	★★				Stranded SPC center conductor
	RUF450	40	★★★	★★	★★★	★				
	RUF520	26.5	★★★	★	★★★	★				
	RUF550	26.5	★★★	★★	★★★	★★				
Economical Low Loss Interconnect REL Series	REL280	26.5	★	★★	★			★		Low cost
	REL350	18		★★	★					
	REL520	18		★★	★					
	REL780	13.5		★★	★		★			
Temperature Phase Stable RTP Series	RTP220		★★	★	★★	★★★★		★★		300PPM

★ Good ★★ Very good ★★★ Excellent ★★★★ Outstanding

Overview RPL Series

Ultra-low Loss Phase and Amplitude Stable Flexible Cable

RPL series from "RF-Coaxial" are phase and amplitude stable low loss cables with max operating frequency options of 18GHz, 26.5GHz, 30GHz, 40GHz, 50GHz, 67GHz and 110GHz. Using micro-porous PTFE dielectrics which provide consistent performance over temperature changes, these cables are ideally for high frequency signal transmission between systems or used in test instruments when low loss and stability are critical. RPL series cable assemblies are available with a broad selection of connectors and ruggedized armors. Bulk cables available as well.

Features

- Minimal phase and attenuation change versus flexure
- Robust for dynamic use with multiple inter-layers
- Very low VSWR and loss, typ VSWR 1.30 to 67GHz
- Broad options of frequency, cable size, connector and armor

Cable Data

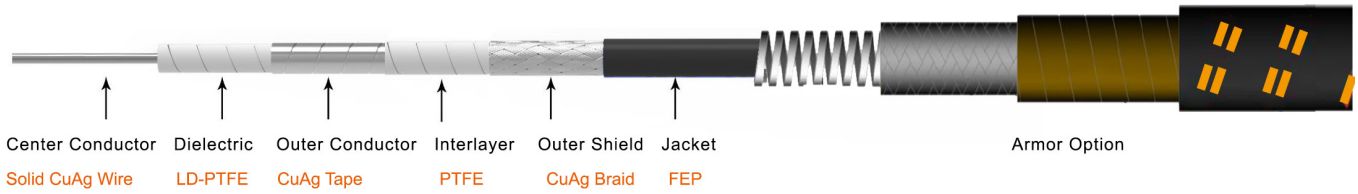
Part Number	Outer Diameter(mm)	Static Bend Radius(mm)	Max Operation Freq(GHz)	Phase Stability @ max freq	Loss(dB/m @ max freq)	Avg Power(watts@ max freq)
RPL180P	1.8	10	110	<±12°@110GHz	13.1	3
RPL220	2.2	11	67	<±8°@67GHz	6.0	29
RPL230P	2.6	11	67	<±7°@67GHz	6.0	29
RPL360P	3.6	18	50	<±5°@50GHz	3.3	55
RPL360	3.6	18	40	<±6°@40GHz	2.6	75
RPL380P	3.8	18	40	<±5°@40GHz	2.2	74
RPL390P	3.9	18	40	<±5°@40GHz	2.6	75
RPL520	5.2	25	26.5	<±5°@26.5GHz	1.3	160
RPL520P	5.4	26	26.5	<±5°@26.5GHz	1.3	160
RPL800	7.9	40	18	<±5°@18GHz	0.7	398
RPL1200	12.0	60	10	<±4°@10GHz	0.4	867

Cross Reference

"RF-Coaxial" Model	GORE	Insulated Wire	Micro-Coax	Harbour	TIMES	Semflex
RPL220, RPL230P	CXN3506					
RPL360,RPL360P	CXN3507	1401	UFB142A			
RPL520, RPL520P	CXN3449	1801	UFB205A		HF190	
RPL800	CXN3450	2801	UFB311A	LLS290	HF290	LA290

RPL Series

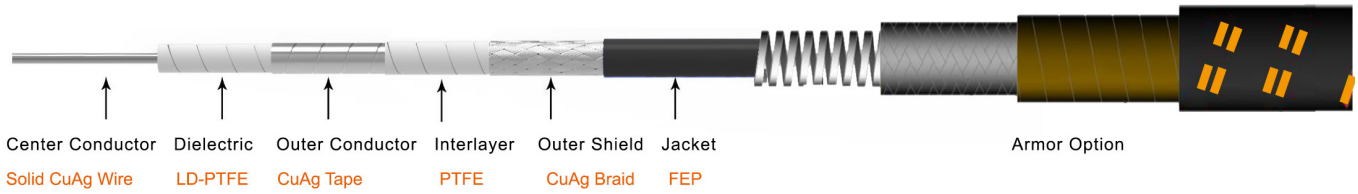
Ultra-low Loss Phase and Amplitude Stable Flexible Cable



	RPL180	RPL220	RPL230P	RPL360P	RPL360	RPL380P
Cable Construction(Diameter in mm)						
Center Conductor	0.29	0.51	0.51	0.72	0.91	1.02
Dielectric	0.94	1.43	1.60	2.15	2.50	2.85
Outer Conductor	1.06	1.55	1.70	2.30	2.66	3.06
Interlayer	1.20	/	2.00	2.60	/	3.22
Outer Shield	1.50	1.85	2.25	3.05	3.06	3.67
Jacket	1.80	2.20	2.60	3.60	3.60	3.80
*Armor Option	AL380	/	AL500&AL640	AL640	AL640	AL640
* Please refer to Page 33 for armor details.						
Mechanical						
Min.Bending Radius Static	10mm	11mm	13mm	18mm	18mm	19mm
Min. Bending Radius Repeated	20mm	22mm	26mm	36mm	36mm	38mm
Weight	9g/m	18g/m	18g/m	34g/m	33g/m	37g/m
Temperature range	-50℃ to +150℃ (cable only), -50℃ to +85℃ (cable assembly)					
Electrical						
Operating Frequency	DC-110 GHz	DC-67 GHz	DC-67 GHz	DC-50 GHz	DC-40 GHz	DC-40 GHz
Impedance	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω
Velocity of Propagation	82%	81%	74%	76%	82%	82%
Shielding Effectiveness	>90 dB	>90 dB	>90 dB	>90 dB	>90 dB	>90 dB
Withstanding Voltage	500 V	500 V	500 V	1000 V	1000 V	1000 V
**Mechanical Phase Stability	<±12°	<±8°	<±7°	<±5°	<±6°	<±5°
***Amplitude Stability vs Shaking	< ±0.2dB	< ±0.2dB	<±0.15dB	<±0.1dB	<±0.15dB	<±0.1dB
Temp Phase Stability (-40℃ to +85℃)	<1500ppm	<700ppm	<1500ppm	<1300ppm	<680ppm	<680ppm
Cable attenuation at 25℃	see graph					
Power handling	see graph					
** Wrap the cable 360 degree around a mandrel whose diameter is ten times of cable outer diameter. *** Shake the cable assembly at a rate of 90 times per minute at a height of 10 cm.						

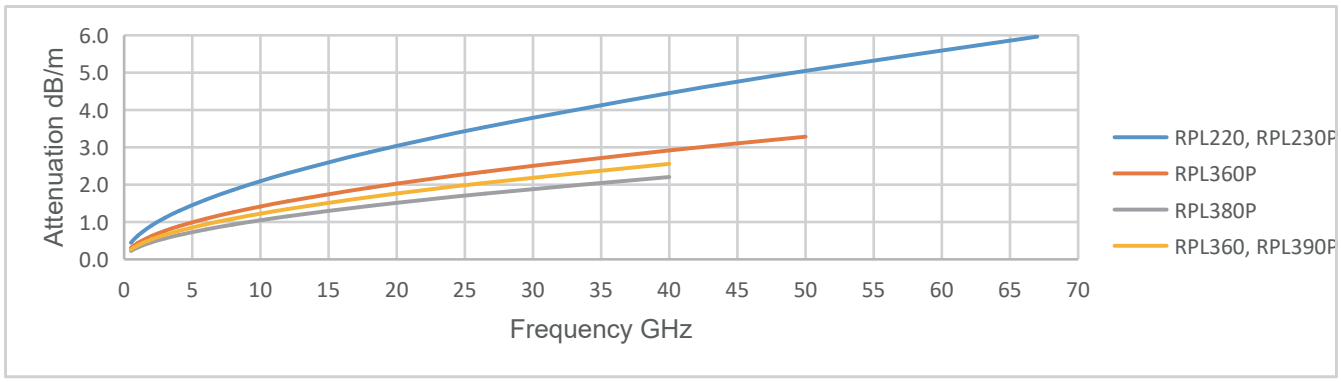
RPL Series

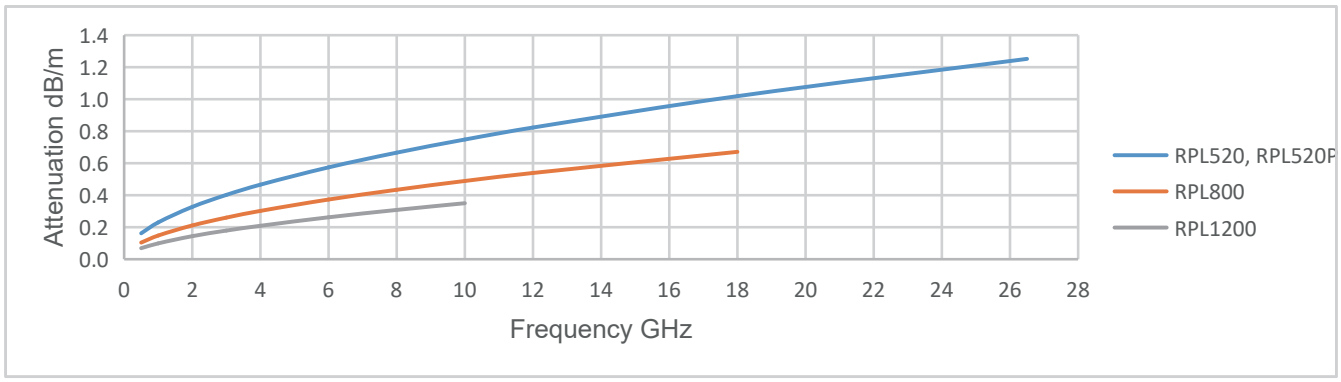
Ultra-low Loss Phase and Amplitude Stable Flexible Cable



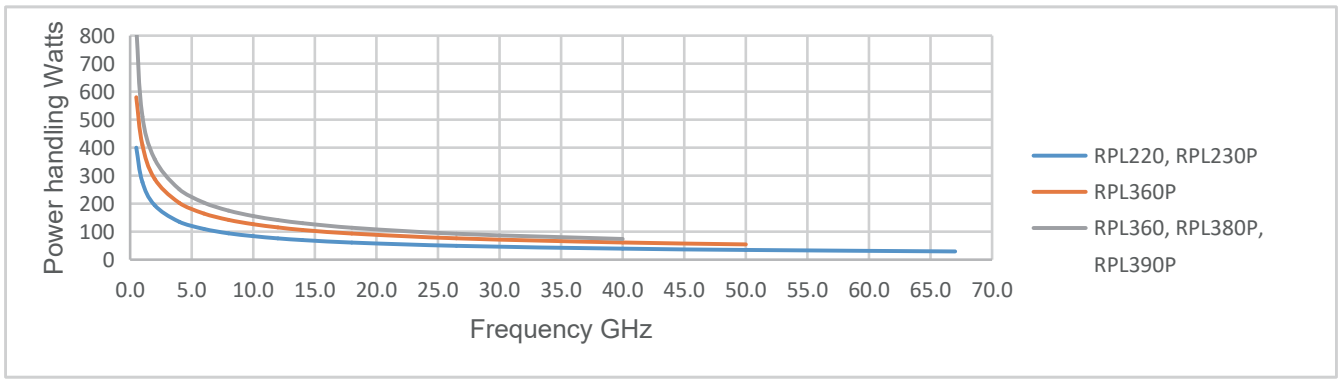
	RPL390P	RPL520	RPL520P	RPL800	RPL1200
Cable Construction(Diameter in mm)					
Center Conductor	0.91	1.45	1.45	2.30	3.80
Dielectric	2.50	4.00	4.00	6.30	10.40
Outer Conductor	2.70	4.20	4.20	6.50	10.78
Interlayer	3.00	/	4.45	/	/
Outer Shield	3.46	4.70	4.90	7.10	11.35
Jacket	3.90	5.20	5.40	7.85	12.00
*Armor Option	AL640	AL780	AL780	AL1050	/
* Please refer to Page 33 for armor details.					
Mechanical					
Min.Bending Radius Static	18mm	25mm	26mm	40mm	60mm
Min. Bending Radius Repeated	36mm	52mm	52mm	80mm	120mm
Weight	35g/m	52g/m	63g/m	130g/m	280g/m
Temperature range	-50℃ to +150℃ (cable only), -50℃ to +85℃ (cable assembly)				
Electrical					
Frequency	DC-40 GHz	DC-26.5 GHz	DC-26.5 GHz	DC-18 GHz	DC-10 GHz
Impedance	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω
Velocity of Propagation	82%	83%	83%	83%	83%
Shielding Effectiveness	>90 dB	>90 dB	>90 dB	>90 dB	>90 dB
Withstanding Voltage	900 V	1500 V	1500 V	2000 V	2000 V
*Mechanical Phase Stability	<±5°	<±5°	<±5°	<±5°	<±4°
***Amplitude Stability vs Shaking	<±0.1dB	<±0.15dB	<±0.1dB	<±0.1dB	<±0.1dB
Temp Phase Stability (-40℃ to +85℃)	<680ppm	<550ppm	<550ppm	<500ppm	<500ppm
Cable attenuation at 25℃	see graph				
Power handling	see graph				
** Wrap the cable 360 degree around a mandrel whose diameter is ten times of cable outer diameter. *** Shake the cable assembly at a rate of 90 times per minute at a height of 10 cm.					

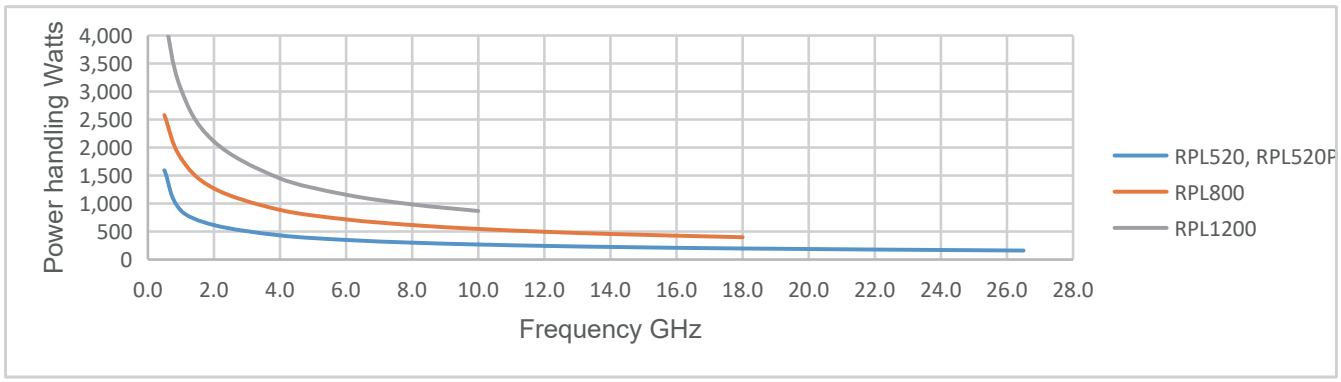
Attenuation (nominal values at +25 °C ambient temperature)



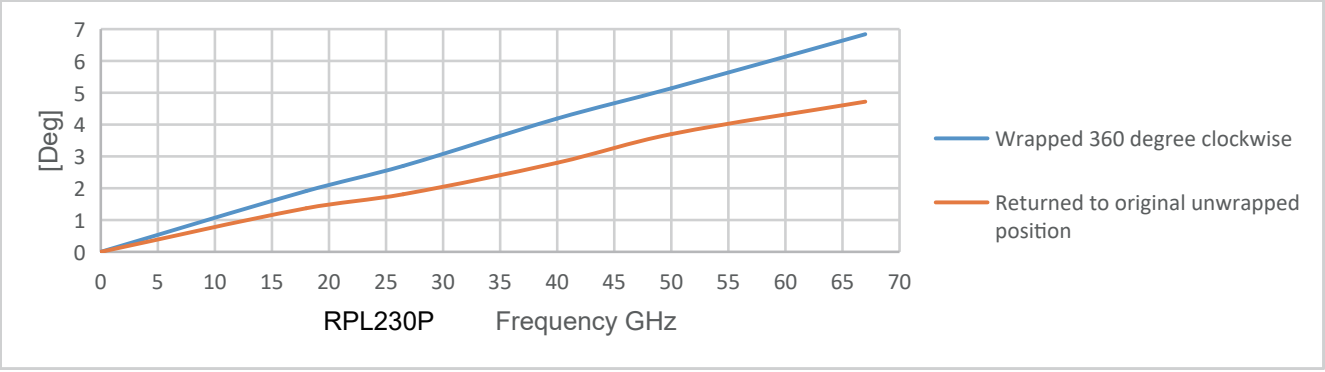


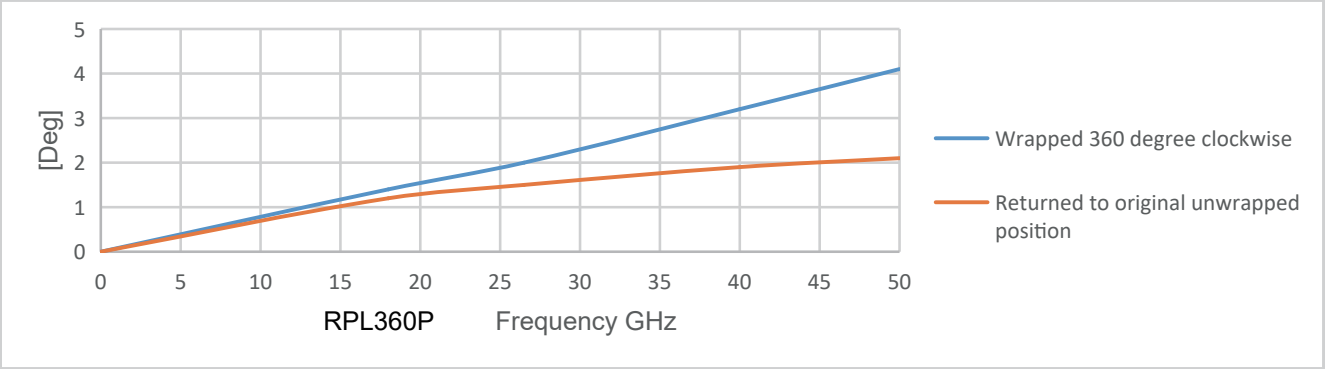
Power handling (maximum values at 40 °C ambient temperature and sea level)



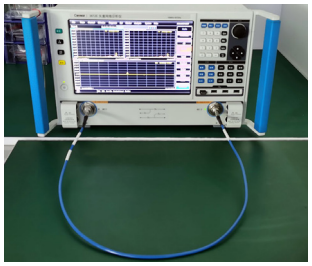
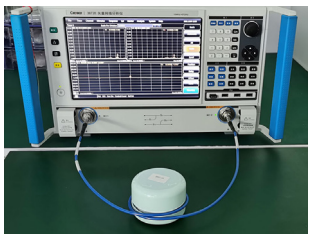
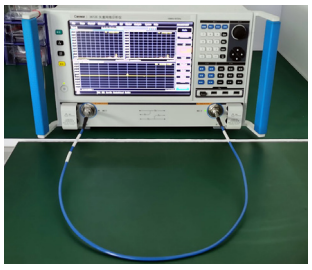


Mechanical Phase Stability



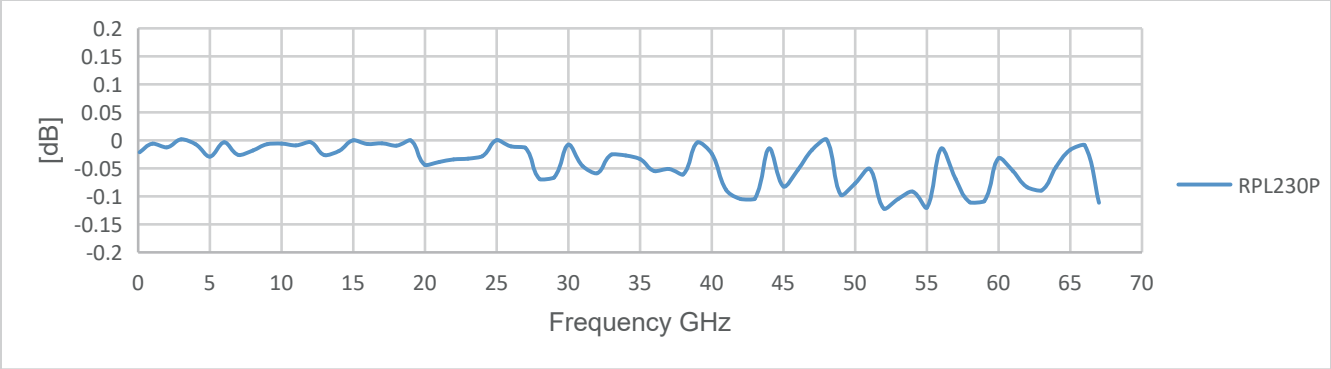


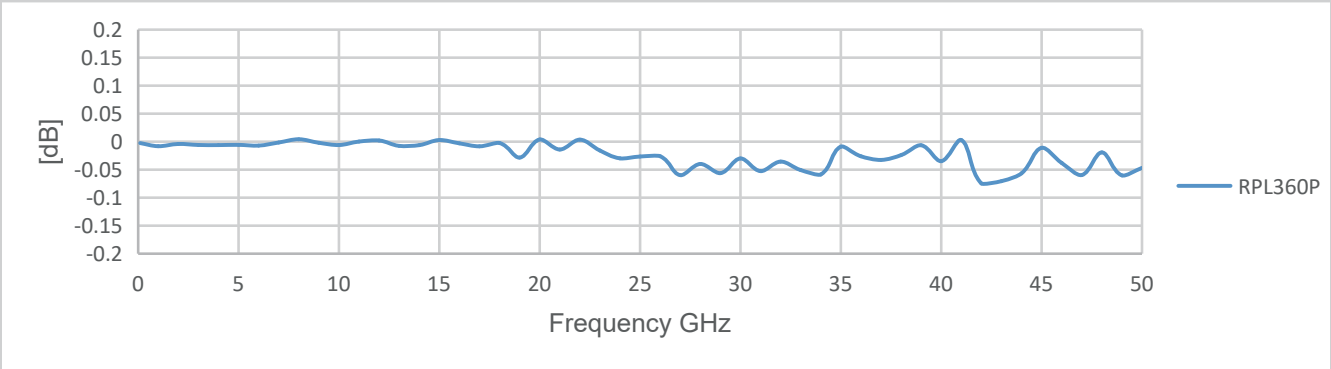
"RF-Coaxial" performs the test of Mechanical Phase Stability of Cable Assembly in below procedures.

Steps	Test Method	Diagram
Initial Test	1) Connect the two ports of cable under test(CUT) with VNA, the cable is held in an initial unwrapped position and is measured in the phase and attenuation. 2) Normalize VNA in the phase. *CUT is 1 meter in length.	
Test with cable wrapped 360 degree clockwise	1)Disconnect the CUT cable and wrap it 360 degree clockwise around a mandrel(diameter is ten times of cable outer diameter). 2) The CUT cable is held in such position for measurement, record the max phase and attenuation change over frequency range.	
Test with cable returned to original unwrapped position	1) Disconnect the CUT cable and return it to its original unwrapped position. 2) The CUT cable is held in such position for measurement, record the max phase change. 3) The worst-case phase variation in the above procedure is recorded as the phase stability value.	

Amplitude Stability vs Shaking

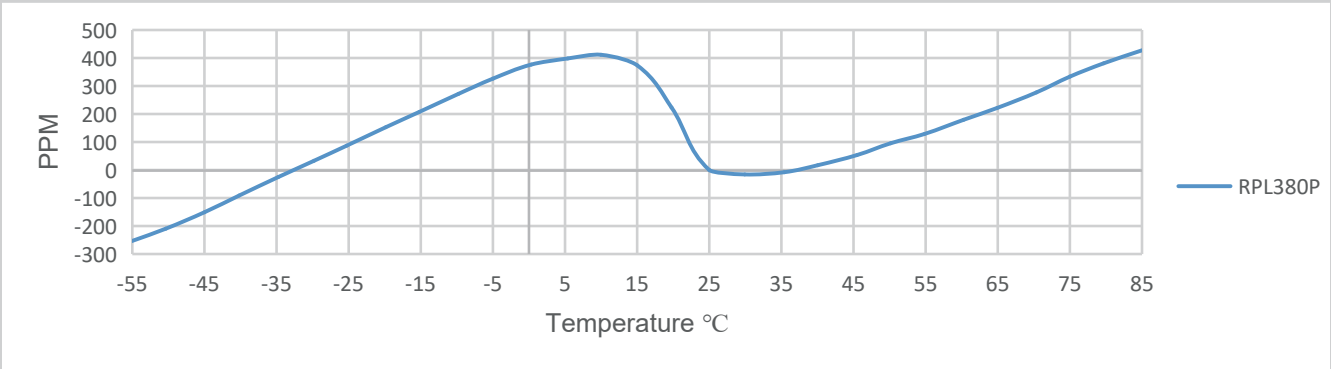
Shake the cable assembly at a rate of 90 times per minute at a height of 10 cm.

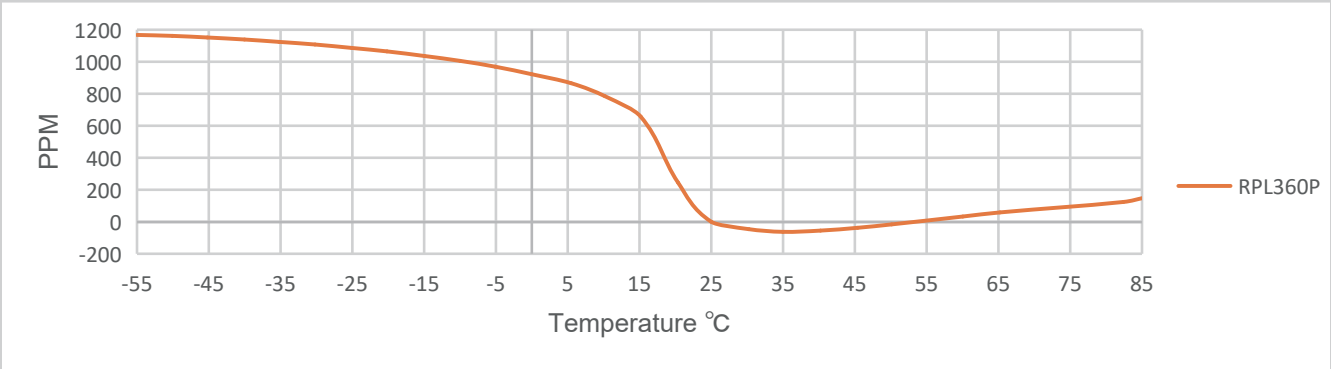




Temperature Phase Stability

Test procedure is detailed on Page 40.





Available Connectors

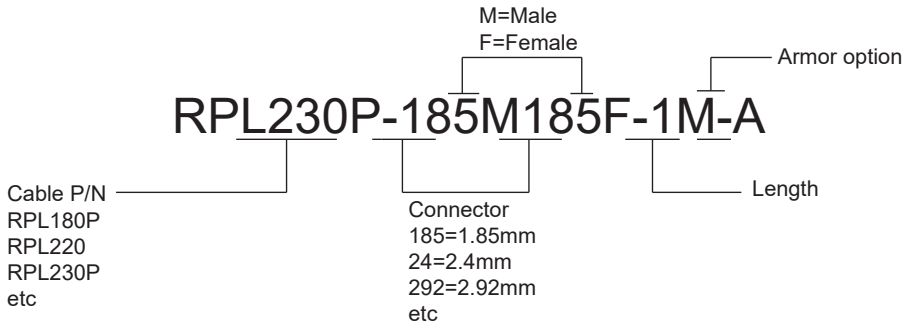
Cable P/N	Connectors	Gender	Orientation	Mounting	Max Freq (GHz)	VSWR Max
RPL180P	1.0mm	M/F	Straight	Standard	110	1.45
RPL220	SMA	M/F	Straight	Standard	26.5	1.3
	2.92mm	M/F	Straight	Standard	40	1.3
	2.4mm	M/F	Straight	Standard	50	1.35
	1.85mm	M/F	Straight	Standard	67	1.4/1.45
	SSMA	Male	Straight	Standard	33	1.4
	SMP	Female	Right Angle	Standard	26.5	1.35
	SMP	M/F	Straight	Standard	40	1.4
	SSMP	M/F	Straight	Standard	67	1.5
RPL230P	SMA	M/F	Straight	Standard	26.5	1.25
	2.92mm	M/F	Straight	Standard	40	1.3
	2.4mm	Male	Straight	Standard	50	1.35
	1.85mm	M/F	Straight	Standard	67	1.4/1.45
RPL360P	N	Male	Straight	Standard	18	1.3
	SMA	M/F	Straight	Standard	26.5	1.25
	3.5mm	M/F	Straight	Standard	33	1.3
	2.92mm	M/F	Straight	Standard	40	1.3
	2.92mm	M	Right Angle	Standard	38	1.4
	2.92mm	Female	Straight	Bulkhead	40	1.4
	2.4mm	M/F	Straight	Standard	50	1.35
RPL360	N	Male	Straight	Standard	18	1.35
	SMA	M/F	Straight	Standard	26.5	1.3
	SMA	Male	Right Angle	Standard	18	1.35
	3.5mm	M/F	Straight	Standard	33	1.3
	2.92mm	M/F	Straight	Standard	40	1.3
	2.92mm	Male	Right Angle	Standard	38	1.4
	2.4mm	Male	Straight	Standard	40	1.35
	SSMA	Male	Right Angle	Standard	33	1.4
RPL380P	SMA	Male	Straight	Standard	26.5	1.3
	2.92mm	Male	Straight	Standard	40	1.3
RPL390P	N	Male	Straight	Standard	18	1.35
	SMA	M/F	Straight	Standard	26.5	1.3
	SMA	Male	Right Angle	Standard	18	1.35
	3.5mm	M/F	Straight	Standard	33	1.3
	2.92mm	M/F	Straight	Standard	40	1.3

Available Connectors

Cable P/N	Connectors	Gender	Orientation	Mounting	Max Freq (GHz)	VSWR Max
RPL520	N	M/F	Straight	Standard	18	1.3/1.4
	N	Male	Right Angle	Standard	18	1.35
	TNC	Male	Straight	Standard	18	1.35
	TNC	Male	Right Angle	Standard	18	1.4
	3.5mm	Male	Straight	Standard	26.5	1.3
	SMA	M/F	Straight	Standard	26.5	1.3
	SMA	Female	Straight	Bulkhead	18	1.3
RPL520P	SMA	Male	Right Angle	Standard	18	1.35
	N	Male	Straight	Standard	18	1.25
	N	Male	Right Angle	Standard	18	1.35
	N	Female	Straight	Standard	18	1.35
	TNC	Male	Straight	Standard	18	1.35
	SMA	Male/Female	Straight	Standard	26.5	1.3
	SMA	Male	Right Angle	Standard	18	1.35
	3.5mm	Male	Straight	Standard	26.5	1.3
RPL800	N	M/F	Straight	Standard	18	1.3
	N	Male	Right Angle	Standard	18	1.35
	TNC	M/F	Straight	Standard	18	1.35
	TNC	Male	Right Angle	Standard	18	1.4
	SMA	M/F	Straight	Standard	18	1.3
	SMA	Male	Right Angle	Standard	18	1.35
RPL1200	N	Male	Straight	Standard	6	1.3
	DIN 7/16	Male	Straight	Standard	6	1.3

Note:Other connectors available upon request.

How to Order



Overview RFL Series

Long Flex Life Triple-shielding Flexible Cable

RFL series from "RF-Coaxial" are long flexing life low loss cables with max operating frequency options of 18GHz, 26.5GHz. These cables are highly robust with triple shield construction of woven flat braid, foil, and round braid, delivering excellent shielding effectiveness and high pull strength. RFL series cable assemblies can be widely used in both interconnection and test applications, where low loss and harsh handling are required.

Features

- Long flex life, ideal as test cables or as interconnect cables in harsh condition
- Superior shielding effectiveness
- Torque resistant and high pull off strength
- Low loss and good phase & amplitude stability with flexure

Cable Data

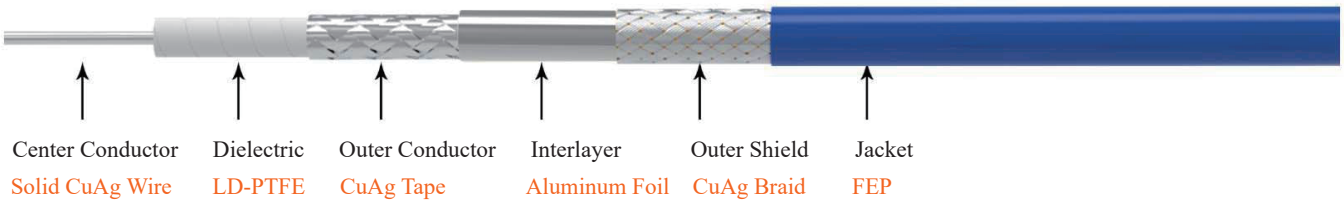
Part Number	Outer Diameter(mm)	Static Bend Radius(mm)	Max Operation Freq(GHz)	Loss (dB/m @ max freq)	Avg Power (watts@ max freq)
RFL460	4.6	20	26.5	1.8	128
RFL520	5.2	25	18	1.3	166
RFL620	6.2	32	18	1.0	202

Cross Reference

Mode	Huber Suhner	TIMES	Harbour Industries	ASTROLAB	Semflex	Micro-Coax
RFL460	SUCOFLEX102	SFT-142	LL160	32022	HP160S	UFA147A
RFL520	SUCOFLEX104	SFT-205	LL142	32055	HP190S	UFA205A
RFL620		SFT-304	LL235	32051	HP305S	

RFL Series

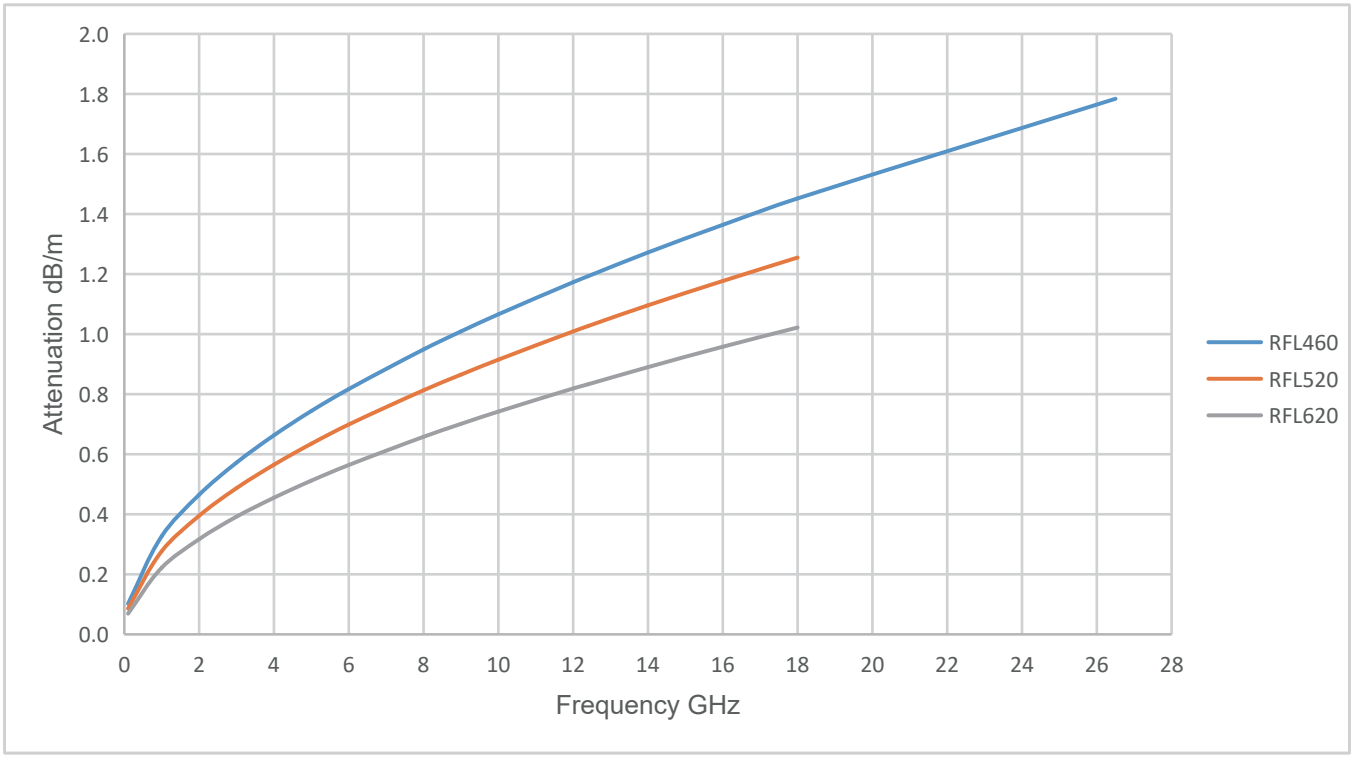
Long Flex Life Triple-shielding Flexible Cable



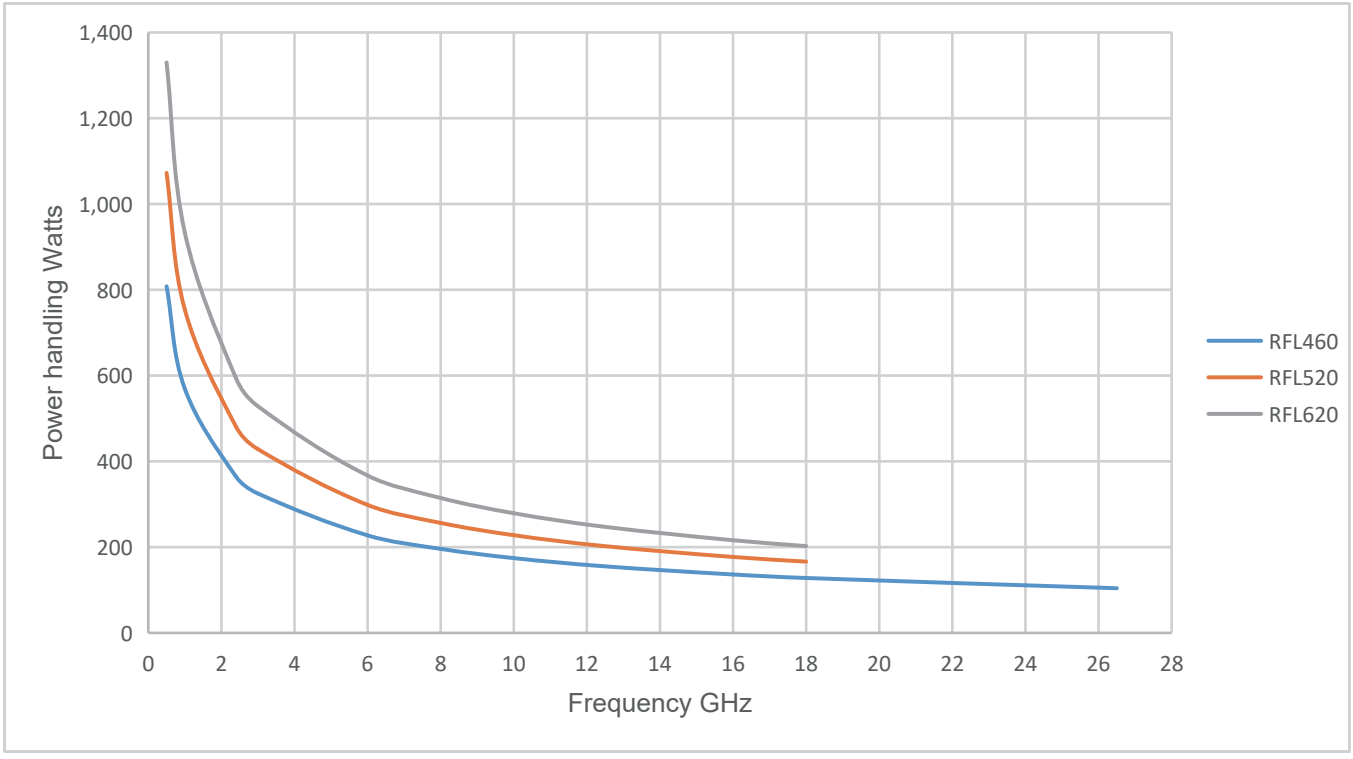
	RFL460	RFL520	RFL620
Cable Construction(Diameter in mm)			
Center Conductor	1.02	1.29	1.57
Dielectric	3.05	3.90	4.72
Outer Conductor	3.25	4.15	4.96
Interlayer	3.49	4.28	5.10
Outer Shield	4.00	4.73	5.55
Jacket	4.60	5.20	6.20
Mechanical			
Min.Bending Radius Static	20mm	25mm	31mm
Min. Bending Radius Repeated	46mm	52mm	62mm
Weight	50g/m	60g/m	85g/m
Temperature range	-50℃ to +150℃ (cable only), -50℃ to +85℃ (cable assembly)		
Electrical			
Operating Frequency	DC-26.5 GHz	DC-18 GHz	DC-18 GHz
Impedance	50 Ω	50 Ω	50 Ω
Velocity of Propagation	76%	76%	76%
Shielding Effectiveness	>100 dB	>100 dB	>90 dB
Withstanding Voltage	1000 V	1500 V	2500 V
*Mechanical Phase Stability	<±6º@ DC-18GHz	<±6º	<±5º
**Amplitude Stability vs Shaking	<±0.2dB	<±0.2dB	<±0.15dB
Cable attenuation at 25℃	see graph		
Power handling	see graph		

* Wrap the cable 360 degree around a mandrel whose diameter is ten times of cable outer diameter.
** Shake the cable assembly at a rate of 90 times per minute at a height of 10 cm.

Attenuation (nominal values at +25 °C ambient temperature)



Power handling (maximum values at 40 °C ambient temperature and sea level)

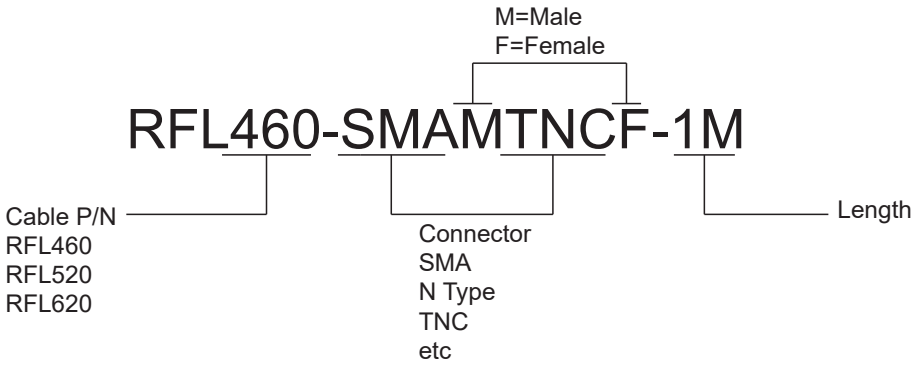


Available Connectors

Cable P/N	Connectors	Gender	Orientation	Mounting	Max Freq (GHz)	VSWR Max
RFL460	SMA	Male	Straight	Standard	18	1.25
	SMA	Female	Straight	Standard	18	1.3
	SMA	Male	Right Angle	Standard	18	1.35
	N	Male	Straight	Standard	18	1.3
	N	Male	Right Angle	Standard	18	1.35
	N	Female	Straight	Standard	18	1.35
	TNC	Male	Straight	Standard	18	1.3
	TNC	Male	Right Angle	Standard	18	1.35
RFL520	SMA	Male	Straight	Standard	18	1.25
	N	Male	Straight	Standard	18	1.3
RFL620	SMA	Male	Straight	Standard	18	1.25
	N	Male	Straight	Standard	18	1.3
	N	Female	Straight	Standard	18	1.35
	TNC	Male	Straight	Standard	18	1.35

Note:Other connectors available upon request.

How to Order



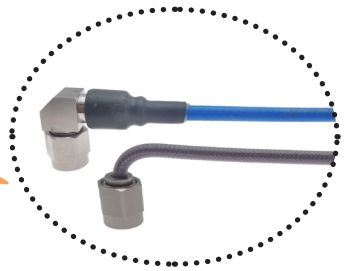
Overview RMB Series

Tight Bend Triple-shielding Flexible Cable

RMB series cable assemblies from "RF-Coaxial" excel in their bendability from connector end, resulting from its unique cable structure and connector design. As alternatives to Minibend cables, RMB series feature superior mechanical phase stability and robustness, operating max to 50 GHz. Now available in 047, 086, 141 cable sizes, with a complimentary connector range of SSMP, SMP, 2.4mm, 2.92mm and SMA.

Features

- Allowing bend from connector end and can be repeatedly bent
- Alternative to Minibend
- High pull force with stainless steel wire braid
- Direct replacement of semi-rigid cables with lower loss, better phase stability
- Cost and space saving by eliminating use of right angle connectors and complicated bend configuration



Replacing right angle connector

Cable Data

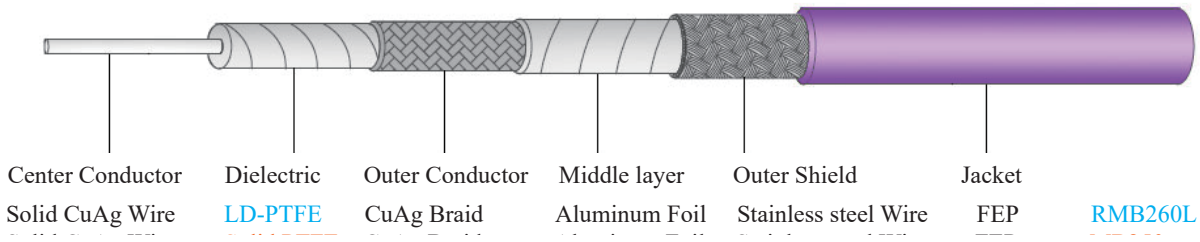
Part Number	Outer Diameter(mm)	Static Bend Radius(mm)	Max Operation Freq(GHz)	Loss (dB/m @ max freq)	Avg Power (watts@ max freq)
RMB200	2.0	8	40	7.3	7
RMB250	2.5	10	50	6.4	35
RMB250L	2.5	10	40	5.0	15
RMB260L	2.6	11	50	4.8	13
RMB360	3.6	8	26.5	2.2	63

Cross Reference

"RF-Coaxial" Model	Huber Suhner	ASTROLAB
RMB200	Microbend	
RMB250	Minibend	32081
RMB260L	Minibend L, Minibend R	32024
RMB360	Mini141	32022

RMB Series

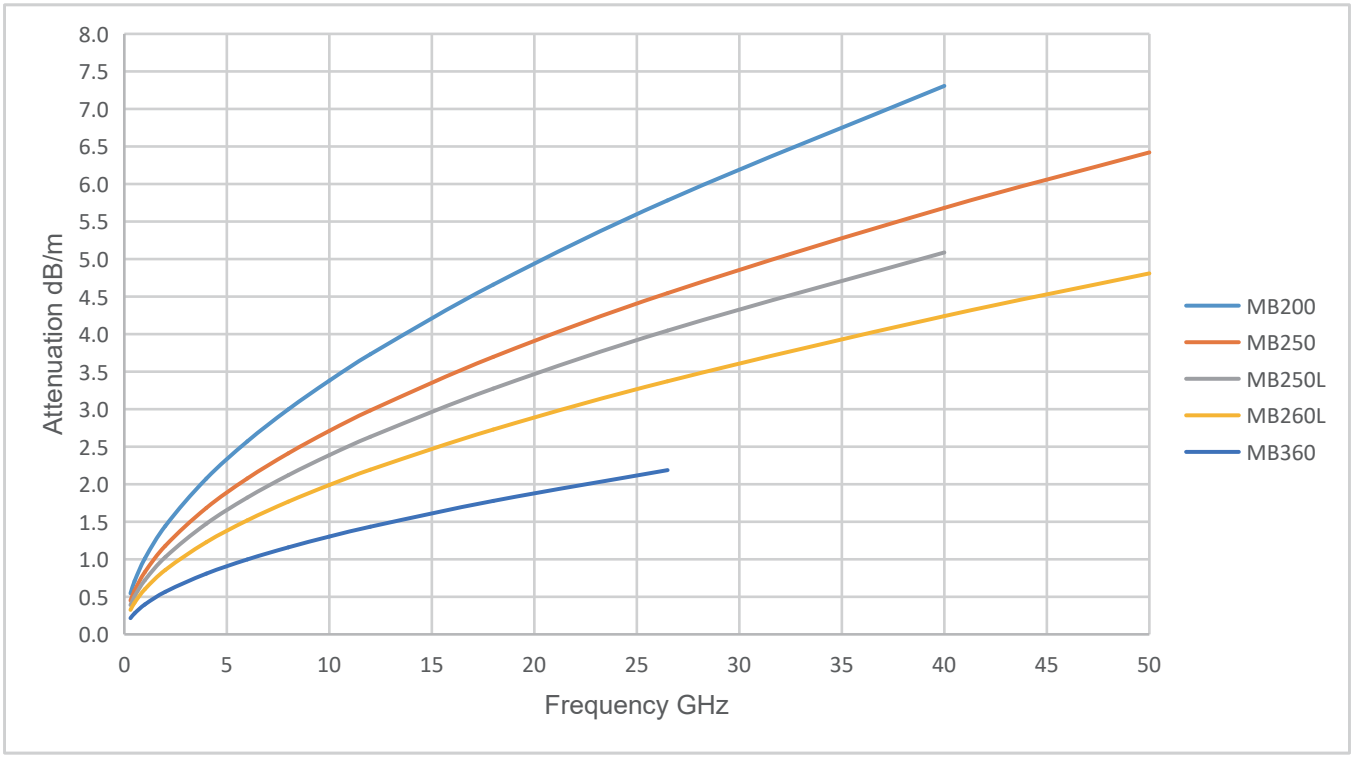
Tight Bend Triple-shielding Flexible Cable



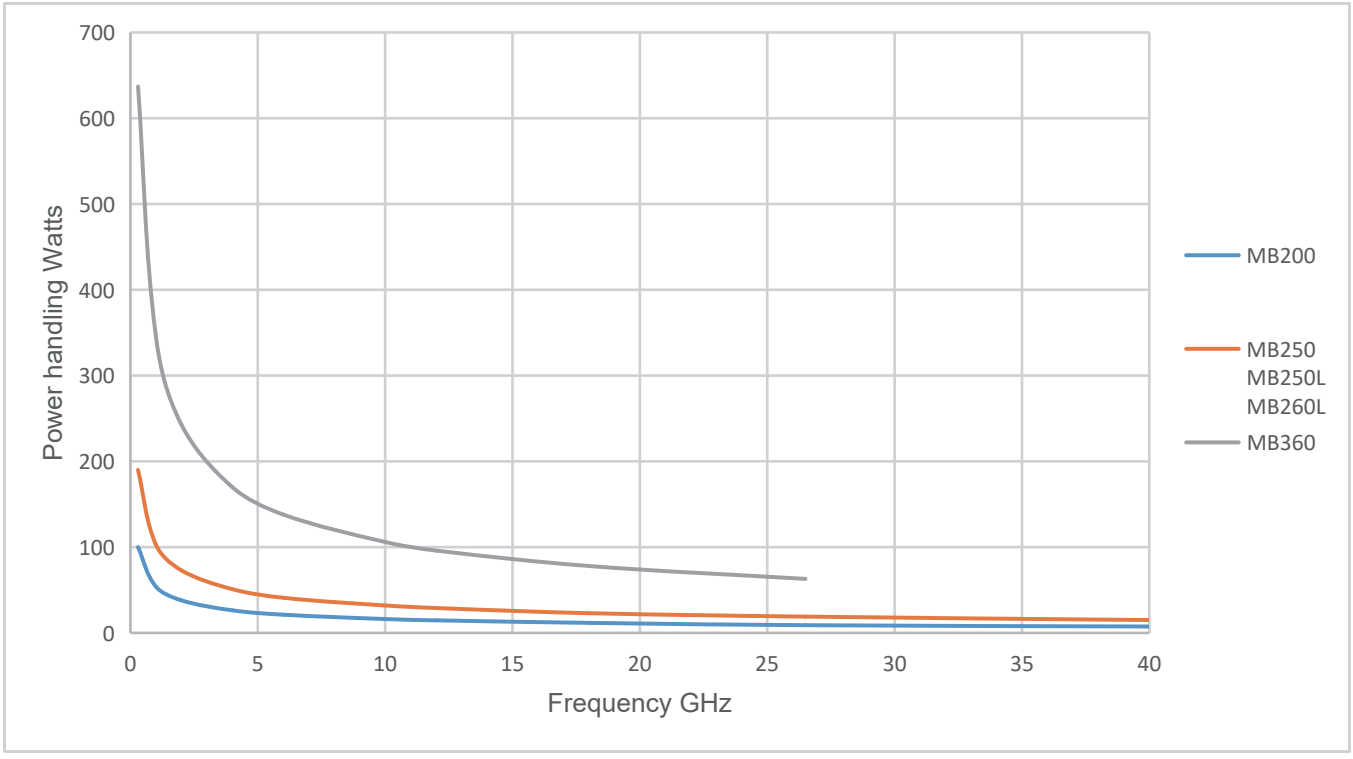
	RMB200	RMB250	RMB250L	RMB260L	RMB360
Cable Construction(Diameter in mm)					
Center Conductor	0.36	0.51	0.51	0.56	0.91
Dielectric	1.14	1.65	1.55	1.70	2.72
Outer Conductor	1.30	1.82	1.71	1.85	2.79
Interlayer	1.45	1.90	1.81	1.98	2.95
Outer Shield	1.66	2.12	2.04	2.24	3.20
Jacket	2.00	2.50	2.50	2.64	3.61
Mechanical					
Min.Bending Radius Static	8mm	10mm	10mm	10.5mm	15 mm
Min. Bending Radius Repeated	20mm	25mm	25mm	26mm	36mm
Weight	12g/m	17g/m	16g/m	17g/m	31g/m
Temperature range	-50℃ to +125℃ (cable assembly)				
Electrical					
Operating Frequency	DC-40 GHz	DC-50 GHz	DC-40 GHz	DC-50 GHz	DC-26.5 GHz
Impedance	50 Ω	50 Ω	50 Ω	50 Ω	50 Ω
Velocity of Propagation	70%	70%	74%	75%	76%
Shielding Effectiveness	>90 dB	>90 dB	>90 dB	>90 dB	>90 dB
Withstanding Voltage	700 V	500 V	500 V	500 V	1000 V
*Mechanical Phase Stability	/	<±15°	<±8°	<±6° @ 40GHz <±8° @ 50GHz	<±6°
**Amplitude Stability vs Shaking	/	<±0.15dB	<±0.15dB	<±0.15dB	<±0.1dB
Cable attenuation at 25℃	see graph				
Power handling	see graph				

* Wrap the cable 360 degree around a mandrel whose diameter is ten times of cable outer diameter.
** Shake the cable assembly at a rate of 90 times per minute at a height of 10 cm.

Attenuation (nominal values at +25 °C ambient temperature)



Power handling (maximum values at 40 °C ambient temperature and sea level)

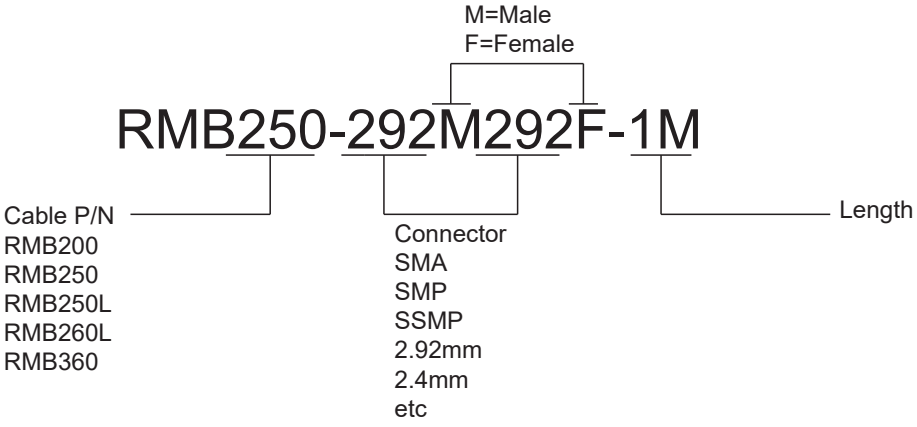


Available Connectors

Cable P/N	Connectors	Gender	Orientation	Mounting	Max Freq (GHz)	VSWR Max
RMB200	SMA	Male	Straight	Standard	26.5	1.35
	SMP	Female	Straight	Standard	26.5	1.35
	SSMP	Female	Straight	Standard	26.5	1.35
RMB250	SMA	Male	Straight	Standard	26.5	1.35
	SMA	Female	Straight	Standard	26.5	1.35
	2.92mm	Male	Straight	Standard	40	1.4
	2.4mm	Male	Straight	Standard	50	1.45
RMB250L	2.92mm	Male	Straight	Standard	40	1.4
RMB260L	SMA	Male	Straight	Standard	26.5	1.35
	2.92mm	Male	Straight	Standard	40	1.4
	2.4mm	Male	Straight	Standard	50	1.45
	2.4mm	Female	Straight	Standard	50	1.45
RMB360	SMA	Male	Straight	Standard	26.5	1.35

Note:Other connectors available upon request.

How to Order



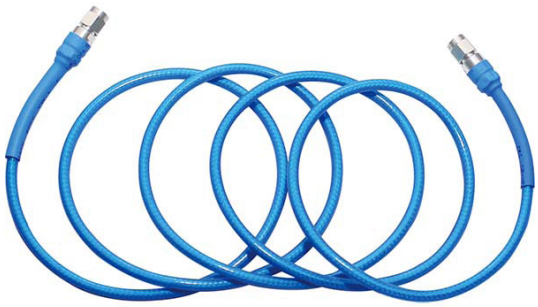
Overview RUF Series

Ultra-Flexible Phase Stable Low Loss Cable

RUF series cable assemblies from “RF-Coaxial” feature super flexibility and mechanical phase stability with stranded SPC center conductor. RUF360 works to 40GHz with unique PTFE wrapping jacket that enhances its flexibility while accomplishing operating temp up to 200℃ . RUF520 and RUF450 work to 26.5GHz and 40GHz respectively, in PUR or FEP jacket. These cables are alternative to H+S Sucoflex, rugged armors available.

Features

- Ultra-flexible with stranded inner conductor
- Excellent phase and amplitude stability over flex
- Durable design, long life time
- Rugged armors available
- Fast delivery for custom lengths



Cable Data

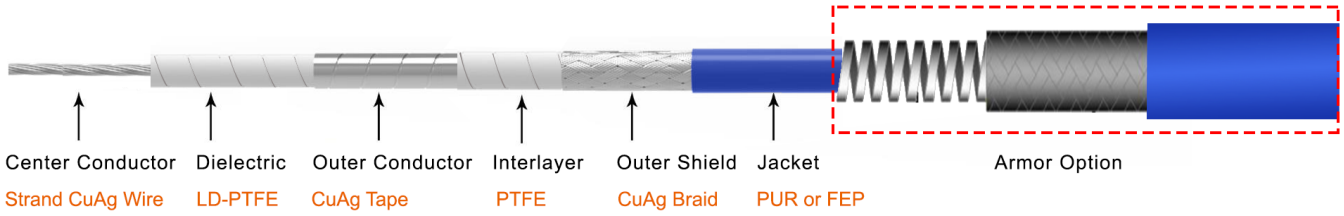
Part Number	Outer Diameter(mm)	Jacket	Static Bend Radius(mm)	Max Operation Freq(GHz)	Loss(dB/m @ max freq)	Avg Power (watts@ max freq)
RUF360	3.8	PTFE	18	40	3.1	54
RUF450	4.5	PUR or FEP	22	40	3.0	57
RUF520	5.2	PUR	18	26.5	2.5	23
RUF550	5.5	FEP	22	26.5	1.6	114

Cross Reference

“RF-Coaxial” Model	Huber Suhner	
RUF360		RUF series from “RF-Coaxial” features multi-stranded center conductor, available in PUR or PTFE jacket which make it highly flexible and ideal to use where frequent flexing is required and phase stability, low loss are uncompromised.
RUF450		
RUF520		
RUF550	SUCOFLEX 126	

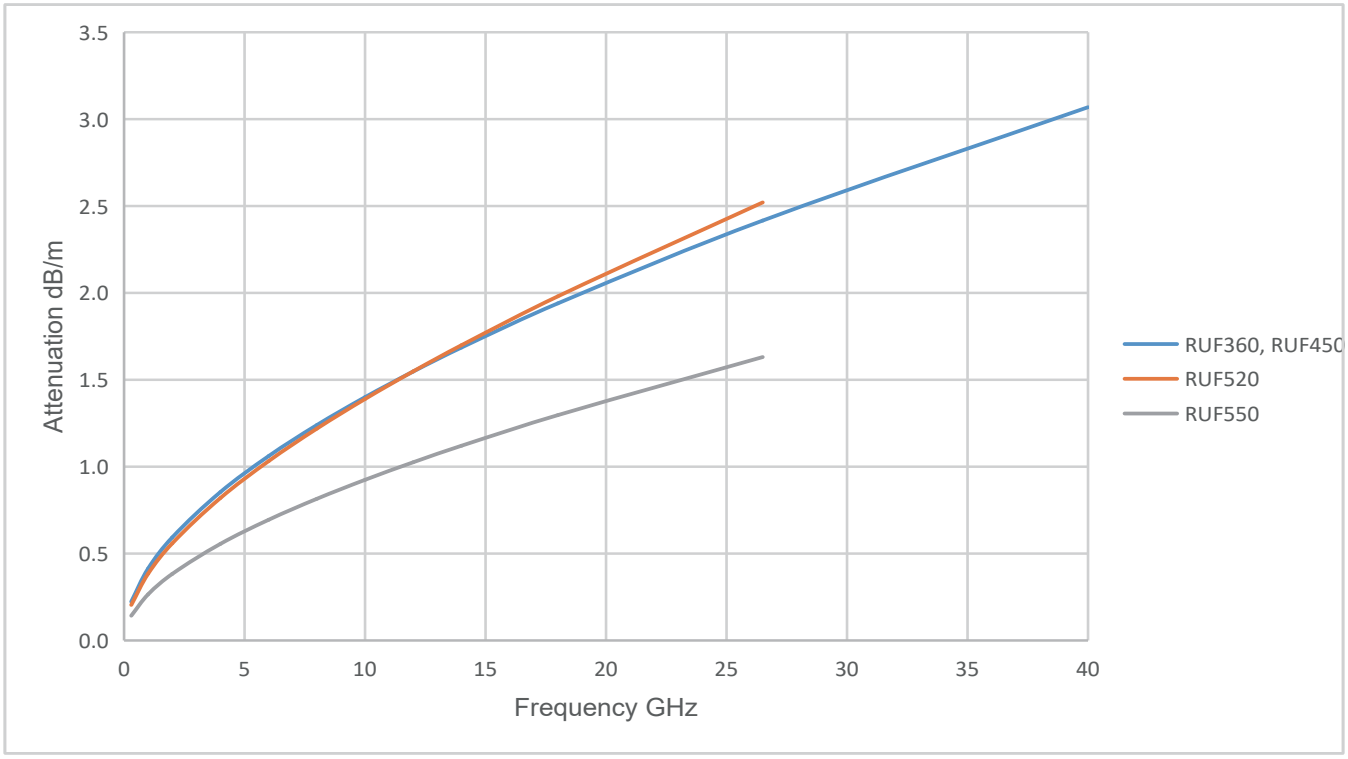
RUF Series

Ultra-Flexible Phase Stable Low Loss Cable

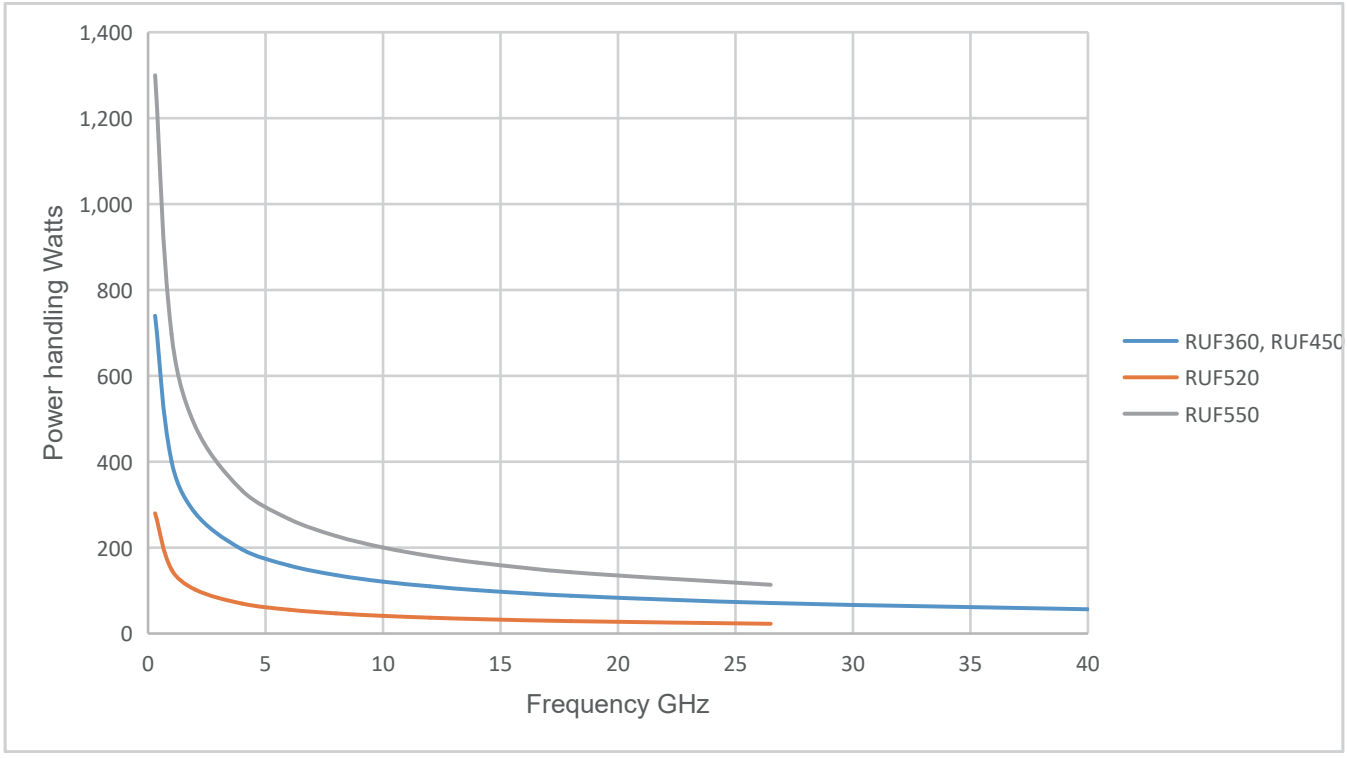


	RUF360	RUF450	RUF520	RUF550
Cable Construction(Diameter in mm)				
Center Conductor	0.91	0.91	1.02	1.44
Dielectric	2.50	2.65	3.03	1.60
Outer Conductor	2.66	2.80	3.22	4.20
Interlayer	2.90	3.08	3.47	4.55
Outer Shield	3.30	3.53	4.05	5.00
Jacket	3.80	4.50	5.20	5.50
*Armor Option	/	/	AU880	AU880
* Please refer to Page 33 for armor details.				
Mechanical				
Min.Bending Radius Static	18mm	22mm	18mm	22mm
Min. Bending Radius Repeated	36mm	45mm	50mm	55mm
Weight	36g/m	37g/m	55g/m	63g/m
Operating Temperature (Cable only)	-50℃ to +85℃ (PUR Jacket), -50℃ to +150℃ (FEP Jacket)			
Electrical				
Operating Frequency	DC-40 GHz	DC-40 GHz	DC-26.5 GHz	DC-26.5 GHz
Impedance	50 Ω	50 Ω	50 Ω	50 Ω
Velocity of Propagation	81%	76%	76%	83%
Shielding Effectiveness	>90 dB	>90 dB	>90 dB	>90 dB
Withstanding Voltage	1000 V	900 V	2000 V	1500 V
**Mechanical Phase Stability	<±5°	<±5°	<±5°	<±3° @18GHz <±7° @26.5GHz
***Amplitude Stability vs Shaking	<±0.15dB	<±0.15dB	<±0.1dB	<±0.2dB
Cable attenuation at 25℃	see graph			
Power handling	see graph			
** Wrap the cable 360 degree around a mandrel whose diameter is ten times of cable outer diameter. *** Shake the cable assembly at a rate of 90 times per minute at a height of 10 cm.				

Attenuation (nominal values at +25 °C ambient temperature)



Power handling (maximum values at 40 °C ambient temperature and sea level)

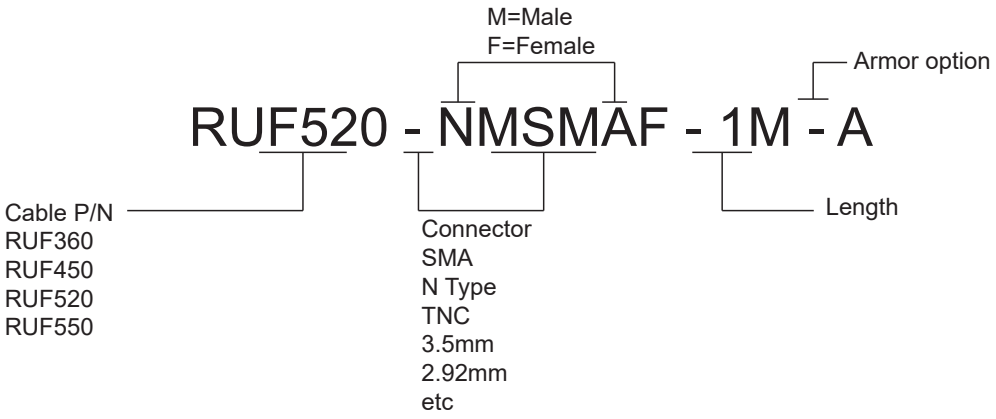


Available Connectors

Cable P/N	Connectors	Gender	Orientation	Mounting	Max Freq (GHz)	VSWR Max
RUF360	SMA	Male	Straight	Standard	26.5	1.3
	SMA	Male	Right Angle	Standard	18	1.35
	3.5mm	Male	Straight	Standard	33	1.3
	2.92mm	M/F	Straight	Standard	40	1.3
RUF450	SMA	Male	Straight	Standard	26.5	1.25
	SMA	Female	Straight	Standard	26.5	1.3
	2.92mm	Male	Straight	Standard	40	1.3
RUF520	TNC	Male	Straight	Standard	13.5	1.35
	N	Male	Straight	Standard	18	1.3
	N	Male	Right Angle	Standard	18	1.4
	SMA	Male	Straight	Standard	26.5	1.25
	SMA	Male	Right Angle	Standard	18	1.35
RUF550	N	Male	Straight	Standard	18	1.3
	SMA	Male	Straight	Standard	26.5	1.3

Note:Other connectors available upon request.

How to Order



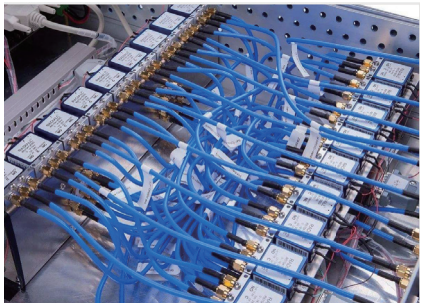
Overview RSP Series

Low Loss Flexible Cable Replacing Semi- lexible Cable

RSP series from “RF-Coaxial” are low cost flexible cables as replacement for semi-flexible cables. Size for size, they offer lower insertion loss and better flexibility than the hand-formable cables. Available in 047, 086 and 141 sizes, they are ideal for high density interconnection use. Bulk cables are offered as well, allowing greater flexibility for end user in connector terminations.

Features

- Superior flexible cable alternative to semi-flexible cables
- Up to 67 GHz, available in 047, 086 and 141 sizes
- Highly competitive pricing, from stock
- Each cable assembly delivered with test plot



Cable Data

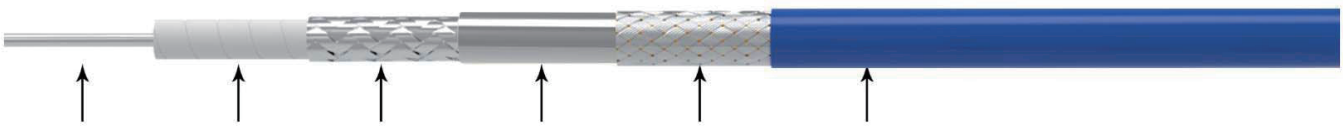
Part Number	Outer Diameter(mm)	Static Bend Radius(mm)	Max Operation Freq(GHz)	Loss (dB/m @ max freq)	Avg Power (watts@ max freq)
RSP160	1.6	6	67	11.9	4
RSP280	2.8	14	40	4.4	16
RSP400	4.0	20	26.5	2.8	36

Cross Reference

“RF-Coaxial” Model	Huber Suhner	TIMES	Harbour	HABIA
RSP160				
RSP280	Multiflex 86	TFlex-405	SS405	Multibend86
RSP400	Multiflex 141	TFlex-402	SS402	Multibend141

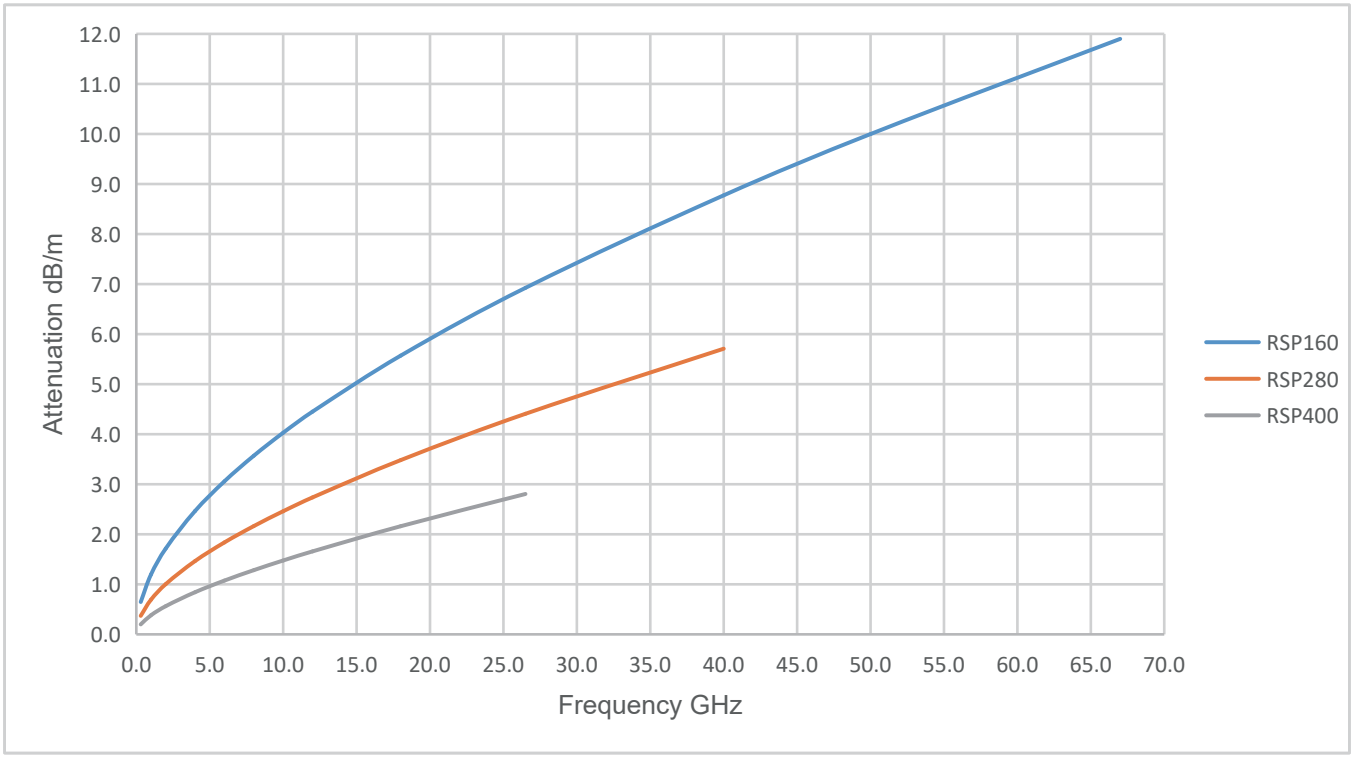
RSP Series

Low Loss Flexible Cable Replacing Semi-flexible Cable

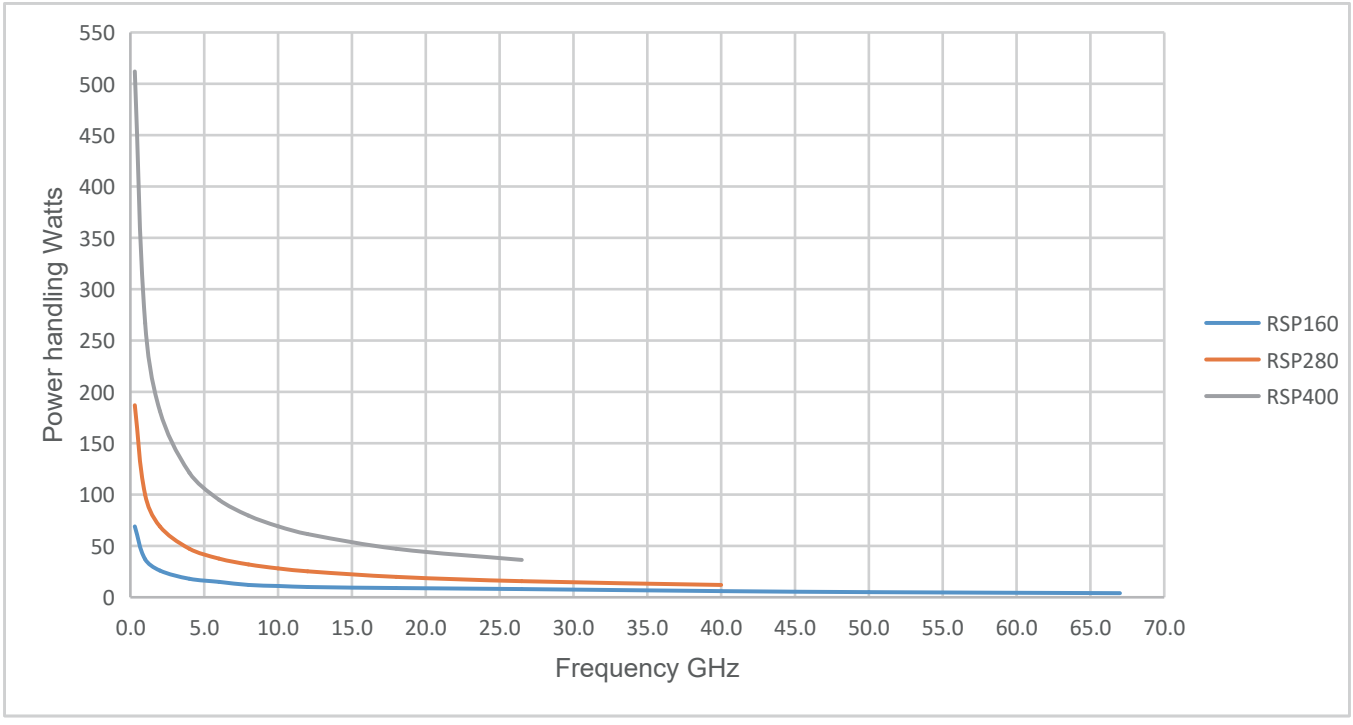


	RSP160	RSP280	RSP400
Cable Construction(Diameter in mm)			
Center Conductor	0.29	0.51	0.91
Dielectric	0.94	1.63	3.00
Outer Conductor	1.14	1.79	3.20
Outer Shield	1.34	2.16	3.60
Jacket	1.60	2.80	4.00
Mechanical			
Min.Bending Radius Static	6mm	14mm	20mm
Min. Bending Radius Repeated	16mm	28mm	40mm
Weight	22g/m	22g/m	49g/m
Temperature range	-50℃ to +150℃ (cable only), -50℃ to +85℃ (cable assembly)		
Electrical			
Operating Frequency	DC-67 GHz	DC-40 GHz	DC-26.5 GHz
Impedance	50 Ω	50 Ω	50 Ω
Velocity of Propagation	70%	70%	70%
Shielding Effectiveness	>90 dB	>90 dB	>90 dB
Withstanding Voltage	500 V	1000 V	1000 V
Cable attenuation at 25℃	see graph		
Power handling	see graph		

Attenuation (nominal values at +25 °C ambient temperature)



Power handling (maximum values at 40 °C ambient temperature and sea level)

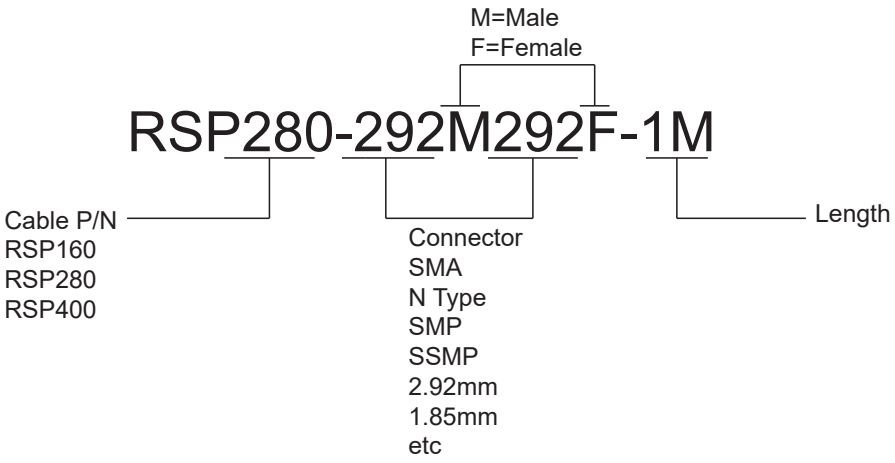


Available Connectors

Cable P/N	Connectors	Gender	Orientation	Mounting	Max Freq (GHz)	VSWR Max
RSP160	SMA	Male	Straight	Standard	18	1.2
	SMA	Female	Straight	Standard	18	1.25
	SMP	Female	Straight	Standard	18	1.35
	SSMP	Female	Straight	Standard	40	1.4
	SSMP	Male	Right Angle	Standard	40	1.6
	2.92	Male	Straight	Standard	40	1.3
	2.4	Male	Straight	Standard	50	1.35
	1.85	Male	Straight	Standard	67	1.4
RSP280	N	Male	Straight	Standard	18	1.3
	SMA	Male	Straight	Standard	18	1.2
	2.92	Male	Straight	Standard	40	1.3
	2.92	Female	Straight	Standard	40	1.35
RSP400	N	Male	Straight	Standard	18	1.3
	SMA	Male	Straight	Standard	26.5	1.25

Note:Other connectors available upon request.

How to Order



Overview REL Series

Economical Low Loss Flexible Cable

REL series cable assemblies from “RF-Coaxial” are very affordable low loss flexible cables with max operating frequency options of 13.5GHz, 18GHz and 26.5GHz. Built from low density PTFE dielectric, these cables are well suited for high frequency signal transmission use when low loss is desired but phase stability is not highly critical.

Features

- Attractive cost vs performance ratio
- Good amplitude stability vs flex and shaking
- Low Loss with low density PTFE dielectric

Applications

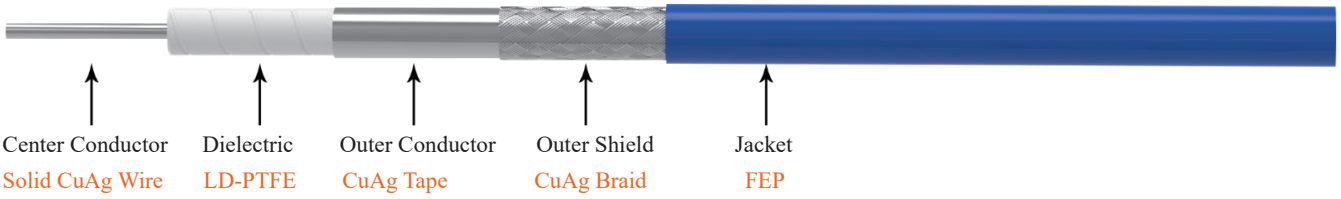
- Ideal for interconnect of assembled systems
- Communication receivers and transmitters
- Low loss test accessory

Cable Data

Part Number	Outer Diameter(mm)	Static Bend Radius(mm)	Max Operation Freq(GHz)	Loss (dB/m @ max freq)	Avg Power (watts@ max freq)
REL280	2.8	12	26.5	3.7	16
REL350	3.5	14	18	1.8	101
REL520	5.2	20	18	1.2	157
REL780	7.8	32	13.5	0.7	392

REL Series

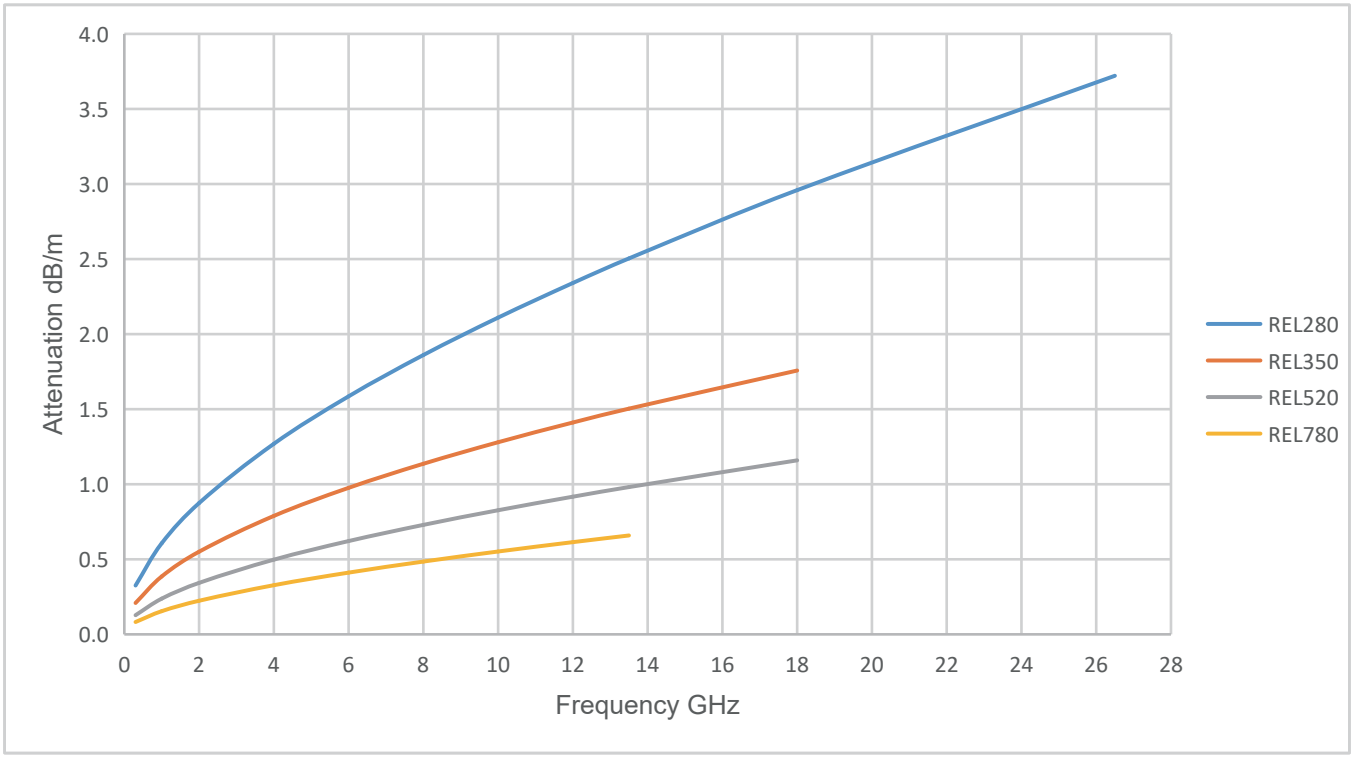
Economical Low Loss Flexible Cable



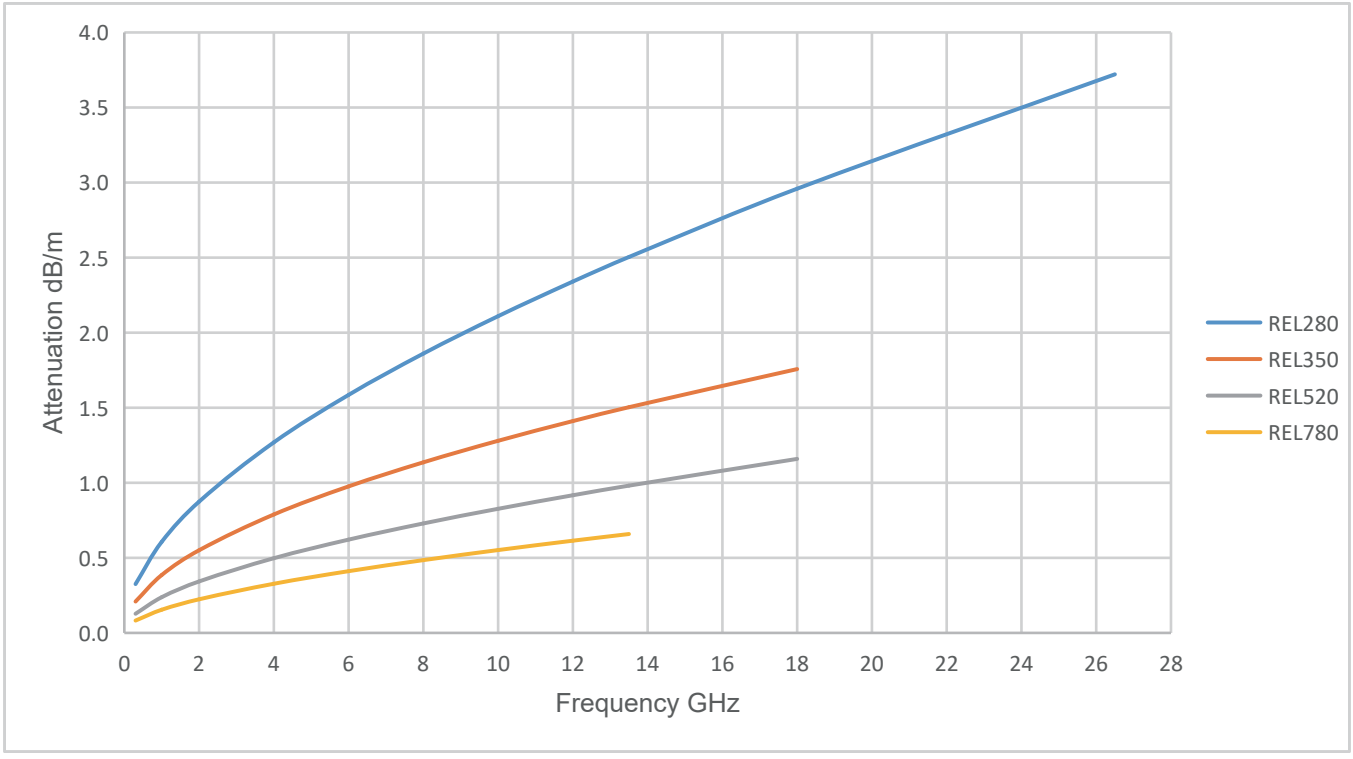
	REL280	REL350	REL520	REL780
Cable Construction(Diameter in mm)				
Center Conductor	0.56	0.94	1.45	2.3
Dielectric	1.67	2.75	4.30	6.6
Outer Conductor	1.83	2.80	4.38	6.7
Outer Shield	2.20	3.20	4.78	7.3
Jacket	2.80	3.50	5.20	7.8
Mechanical				
Min.Bending Radius Static	12mm	14mm	20mm	35mm
Min. Bending Radius Repeated	28mm	35mm	52mm	75mm
Weight	18g/m	29g/m	60g/m	110g/m
Temperature range	-50℃ to +150℃ (cable only), -50℃ to +85℃ (cable assembly)			
Electrical				
Operating Frequency	DC-26.5 GHz	DC-18 GHz	DC-18 GHz	DC-13.5 GHz
Impedance	50 Ω	50 Ω	50 Ω	50 Ω
Velocity of Propagation	76%	76%	76%	76%
Shielding Effectiveness	>90 dB	>90 dB	>90 dB	>90 dB
Withstanding Voltage	500 V	800 V	1500 V	2000 V
*Mechanical Phase Stability	<±10º	<±8º	<±6º@ DC-13.5GHz	<±6º
**Amplitude Stability vs Shaking	<±0.1dB	<±0.1dB	<±0.1dB	<±0.1dB
Cable attenuation at 25℃	see graph			
Power handling	see graph			

* Wrap the cable 360 degree around a mandrel whose diameter is ten times of cable outer diameter.
** Shake the cable assembly at a rate of 90 times per minute at a height of 10 cm.

Attenuation (nominal values at +25 °C ambient temperature)



Power handling (maximum values at 40 °C ambient temperature and sea level)

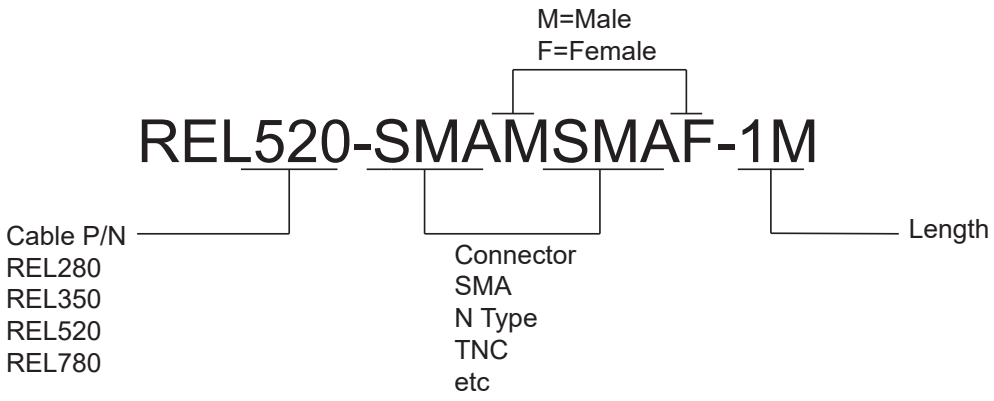


Available Connectors

Cable P/N	Connectors	Gender	Orientation	Mounting	Max Freq (GHz)	VSWR Max
REL280	SMA	Male	Straight	Standard	26.5	1.25
	N	Male	Straight	Standard	18	1.3
REL350	SMA	Male	Straight	Standard	18	1.25
	N	Male	Straight	Standard	18	1.3
REL520	SMA	Male	Straight	Standard	18	1.35
	N	Male	Straight	Standard	13.5	1.3
	N	Male	Right Angle	Standard	13.5	1.35
	N	Female	Straight	Standard	13.5	1.35
	TNC	Male	Straight	Standard	13.5	1.35
REL780	SMA	Male	Straight	Standard	13.5	1.3
	SMA	Male	Right Angle	Standard	13.5	1.35
	N	Male	Straight	Standard	13.5	1.3
	N	Male	Right Angle	Standard	13.5	1.35
	N	Female	Straight	Standard	13.5	1.35
	TNC	Male	Straight	Standard	13.5	1.35

Note:Other connectors available upon request.

How to Order



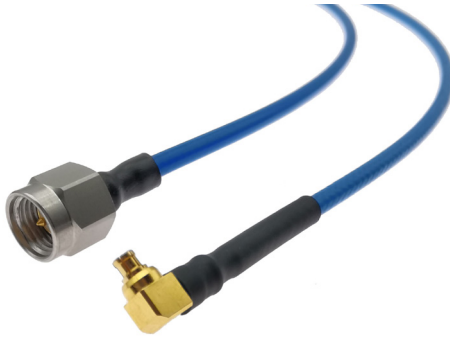
Overview RTP Series

Temperature Phase Stable Cable

RTP series from “RF-Coaxial” is Low-loss and Phase-stable vs. temperature cables designed for phase-sensitive applications where minimal phase change over temperature is demanded.
Built from PFA dielectric, RTP series cables offer outstanding 300 PPM (-40 to 60 °C) phase stability. PTFE, despite its excellent properties at high frequencies, shows a steep shift in phase in the temperature range of 15°C to 25°C. This phenomenon also known as PTFE knee could cause several problems such as detecting inefficiency, test measurement error etc. RTP series cables are developed to solve this challenge.

Features

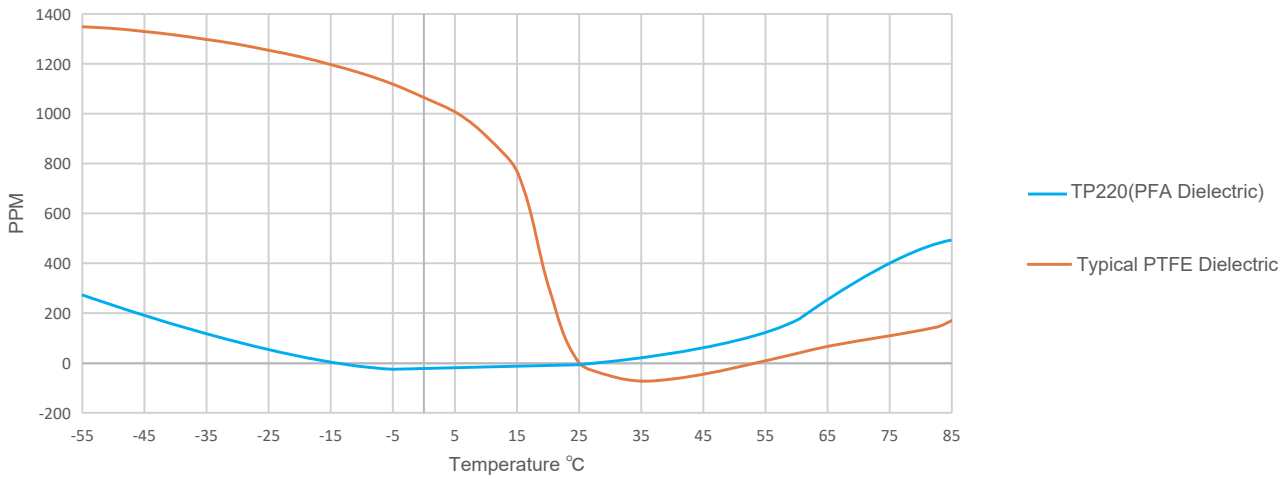
- Excellent phase and insertion loss stability vs temperature
- No PTFE “Knee”
- Low loss operating to 40GHz
- Small bending radii and low profile for easy routing
- Available with 2.92mm, SMP, SSMP cable assemblies



Applications

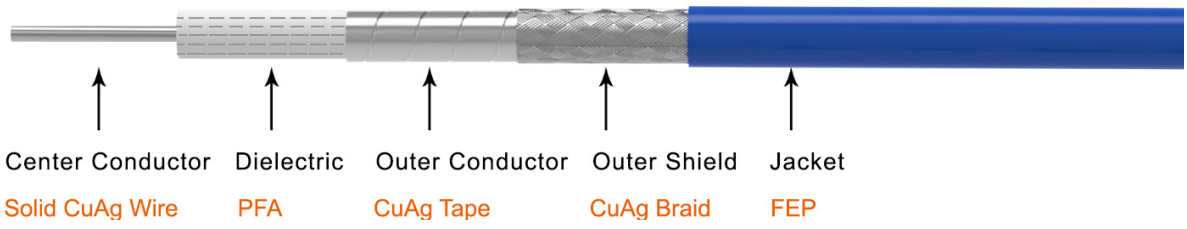
- Phased array antennas
- Synthetic apeture radar satellites
- Network analyzer measurements

Temperature Phase Stability (PFA versus PTFE)



RTP Series

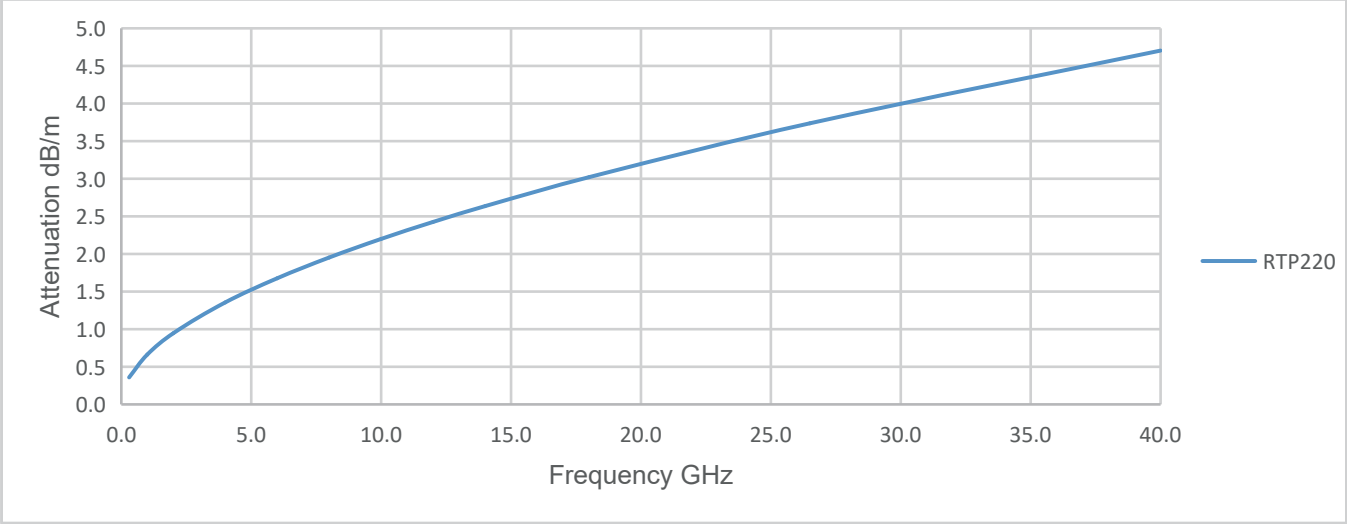
Temperature Phase Stable Cable



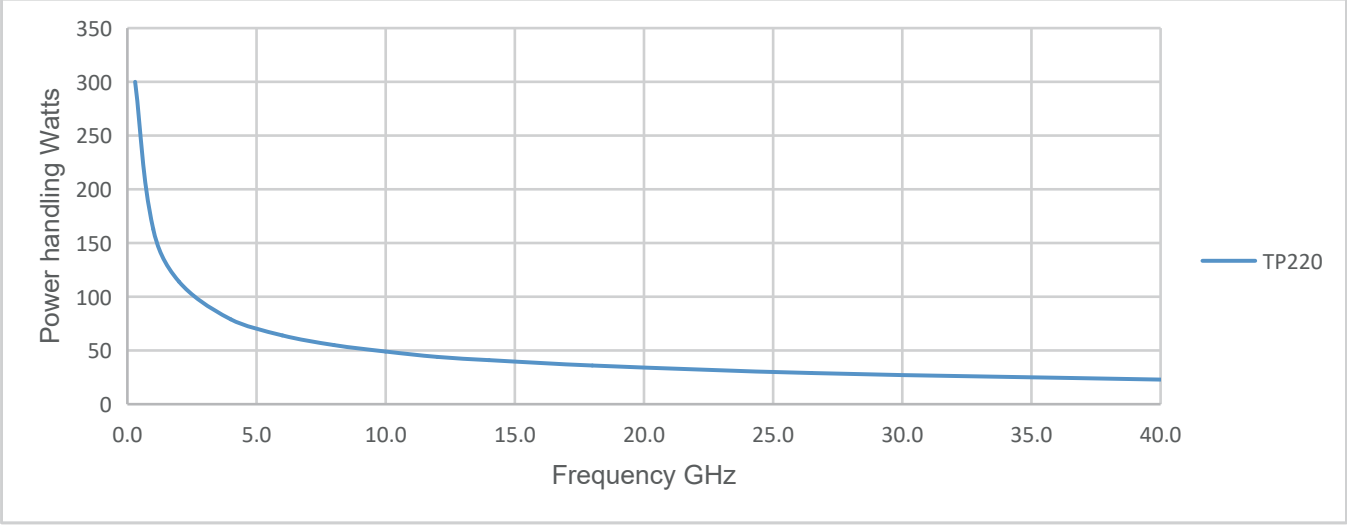
	RTP220
Cable Construction(Diameter in mm)	
Center Conductor	0.51
Dielectric	1.40
Outer Conductor	1.56
Outer Shield	1.87
Jacket	2.20
Mechanical	
Min.Bending Radius Static	15mm
Min. Bending Radius Repeated	22mm
Weight	13g/m
Temperature range	-50℃ to +150℃ (cable only), -50℃ to +85℃ (cable assembly)
Electrical	
Operating Frequency	DC-40 GHz
Impedance	50 Ω
Velocity of Propagation	82%
Shielding Effectiveness	>90 dB
Withstanding Voltage	400 V
*Mechanical Phase Stability	<±6º
**Amplitude Stability vs Shaking	<±0.15dB
Temp Phase Stability (-40℃ to +60℃)	<300ppm
Cable attenuation at 25℃	see graph
Power handling	see graph

* Wrap the cable 360 degree around a mandrel whose diameter is ten times of cable outer diameter.
** Shake the cable assembly at a rate of 90 times per minute at a height of 10 cm.

Attenuation (nominal values at +25 °C ambient temperature)



Power handling (maximum values at 40 °C ambient temperature and sea level)



Available Connectors

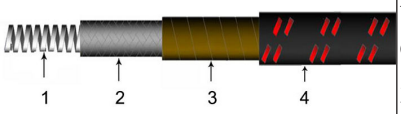
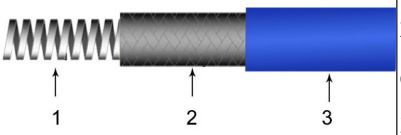
Cable P/N	Connectors	Gender	Orientation	Mounting	Max Freq (GHz)	VSWR Max
RTP220	SMA	Male	Straight	Standard	26.5	1.3
	SMA	Female	Straight	Standard	18	1.3
	2.92mm	F/M	Straight	Standard	40	1.3
	SMP	Female	Straight	Standard	40	1.4
	SMP	Female	Right Angle	Standard	26.5	1.45
	SSMP	Female	Straight	Standard	40	1.4

Note:Other connectors available upon request.

Armored Cable Assembly

Introduction

Armors are designed to withstand harsh environments and rough handling, significantly extending the life of cable assembly. “RF-Coaxial” offers a number of rugged armor options to suit different applications and budgets.

Armor Code	Armor Illustration	Armor Construction	Features
RAL		1.Crush Resistance Layer: Stainless steel spiral 2.Strengthening Layer: Silver plated copper braid 3.Waterproof Layer: PTFE Binder 4.Armor Jacket: Braiding PTFE	● Operating temperature to +200℃ ● Providing four layers of protection ● Ultimate crush and abrasion resistance ● Long-term reliability with pull relief design ● Excellent flexibility ● Flexing life: 20,000 times
RAU		1.Crush Resistance Layer: Stainless steel spiral 2.Strengthening Layer: Silver plated copper braid 3.Armor Jacket: PUR	● Operating temperature limited to +85℃ ● High mechanical strength and ruggedness ● Highest flexibility ● Flexing life: 15,000 times
RSA		1.Armor Jacket: Stainless steel interlock	● Superior flexibility but heavy in weight ● Excellent crush resistance, withstanding outdoor or harsh enviroment ● Lower cost options
RPV		1.Armor Jacket: PVC	● Operating temperature limited to +75℃ ● Waterproof, resistant to most chemicals ● Lowest cost options

Armored Cable Assembly in AL Armor

Features and Benefits

- Specially designed for Phase Stable Low Loss RPL series cables
- Available in standard and low profile armor sizes
- Excellent phase and amplitude stability with flexure
- Precise and repeatable measurements
- Highly flexible and longer flex life
- Strain relief design and multi-layer armors against tension, torsion and abrasion

Applications

- Test cables for VNA and RF/Microwave instruments
- Bench-top, RF production testing
- Wafer probing
- Automatic test equipment systems

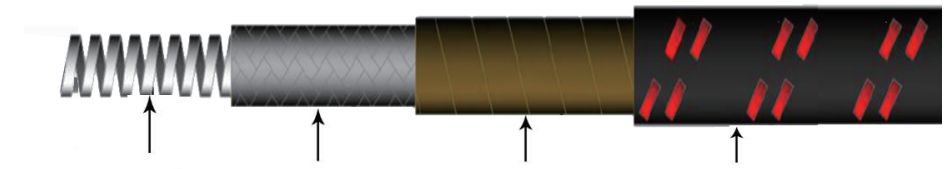
Standard AL Armored Cable Assemblies

Part Number	Freq Range (GHz)	VSWR Max	IL Max (dB)	Mechanical Phase Stability (Deg)	Amplitude Stability vs Shaking (dB)	Flex Life Min (cycles)	Connector
RPL180P-1M1M-L-A	DC-110	1.45	14.4	<±12	<±0.2	20000	1.0mm
RPL230P-185M185M-L-A	DC-67	1.4	7.1	<±7	<±0.15	20000	1.85mm
RPL360P-24M24M-L-A	DC-50	1.35	4	<±5	<±0.1	20000	2.4mm
RPL380P-292M292M-L-A	DC-40	1.3	2.8	<±5	<±0.1	20000	2.92mm
RPL520P-SMAMSMAM-L-A	DC-26.5	1.3	1.7	<±5	<±0.1	20000	SMA
RPL520P-NMNM-L-A	DC-18	1.25	1.5	<±5	<±0.1	20000	N Type

Notes:

1. Insertion loss refers to the loss of 1 meter cable assembly.
2. L in the Part Number refers to the length of cable assembly.
3. Custom length and other connector types as right angle, female etc are available.

Anatomy of AL Armor



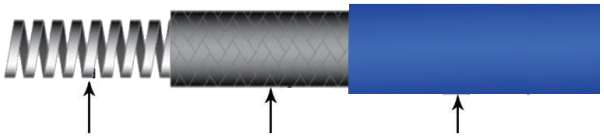
Armor P/N	RAL380	RAL500	RAL640	RAL780	RAL1050
Armor Size					
Crush Resistance Layer I.D.	2.3mm	3.0mm	4.0mm	5.5mm	8.5mm
Crush Resistance Layer O.D.	2.8mm	3.6mm	4.8mm	6.4mm	9.3mm
Strengthening Layer	3.1mm	3.9mm	5.4mm	7.0mm	9.9mm
Waterproof Layer	3.2mm	4.1mm	5.4mm	7.1mm	10.0mm
Armor Jacket	3.8mm	4.7mm	6.4mm	7.8mm	10.9mm
Mechanical					
Weight	25g/m	42g/m	66g/m	93g/m	115g/m
Static Bend Radius	20mm	24mm	32mm	39mm	50mm
Crush Resistance	＞1000N/cm				
Temperature range	-55℃ to +200℃				
Applicable Cables	PL180P	PL230P	PL230P PL360 PL360P PL380P PL390P	PL520P FL460 FL520	PL800

Armored Cable Assembly in AU Armor

Features and Benefits

- Operating temperature limited to +85℃
- High mechanical strength and ruggedness
- Highest flexibility
- Flexing life: 15,000 times

Anatomy of AU Armor



Armor P/N	RAU660	RAU880	RAU1200
Armor Size			
Crush Resistance Layer I.D.	4.0mm	5.5mm	8.5mm
Crush Resistance Layer O.D.	4.8mm	6.5mm	9.3mm
Strengthening Layer	5.4mm	7.1mm	9.9mm
Armor Jacket	6.6mm	8.8mm	11.9mm
Mechanical			
Weight	65g/m	105g/m	150g/m
Static Bend Radius	33mm	44mm	60mm
Crush Resistance	800N/cm		
Temperature range	-55℃ to +85℃		
Applicable Cables	PL360 PL360P PL380P PL390P	PL520P FL520 UF520 UF550	PL800

Standard AU Armored Cable Assemblies

Part Number	Freq Range (GHz)	VSWR Max	IL Max (dB)	Mechanical Phase Stability (Deg)	Amplitude Stability vs Shaking (dB)	Flex Life Min (cycles)	Connector
RUF520-SMAMSMAM-L-A	DC-26.5	1.25	3.1	<±5	<±0.1	15000	SMA
RUF520-NMNM-L-A	DC-18	1.25	2.5	<±4	<±0.1	15000	N Type

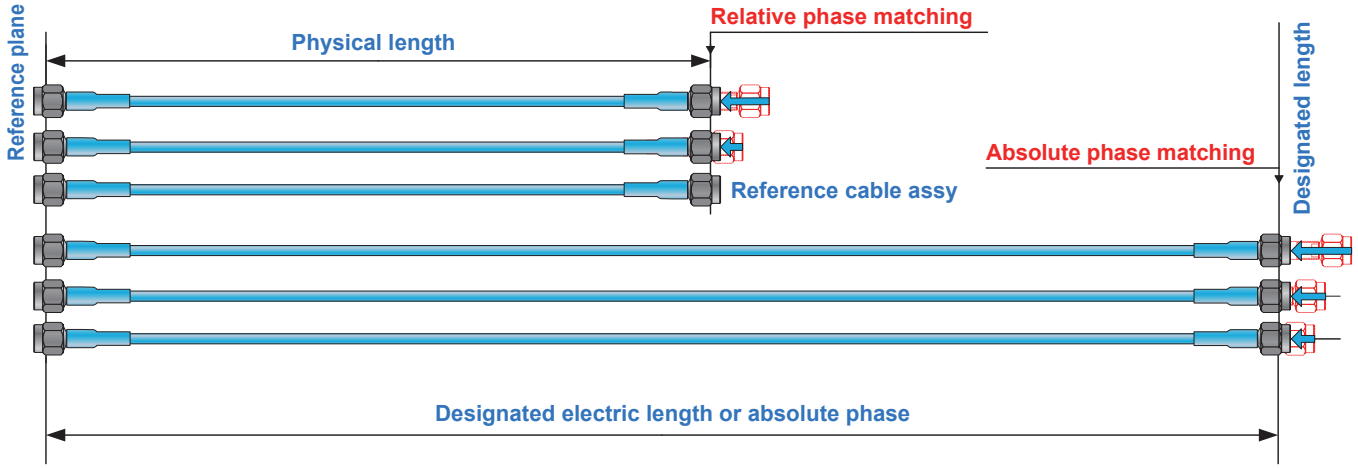
Notes:
1. Insertion loss refers to the loss of 1 meter cable assembly.
2. L in the Part Number refers to the length of cable assembly.

Phase Matched Cable Assemblies

Nowadays the microwave systems are in increased need for phase matched coaxial cable assemblies, with applications in Phased Array Radars, Multi-Beam Antenna Arrays, Multi-Channel Amplifiers and Environmental, Production or Lab Testing etc.

"RF-Coaxial" provides two different versions of phase matching as shown in below diagram:

Absolute Phase Matching and **Relative Phase Matching**



The match can be specified in **Electrical Length Match in Degrees** at a Specified Frequency(i.e.±5° @ 18 GHz) or in **Time Delay Match** (i.e.±2 ps). Please refer to Page 42 for detailed engineering information.

Thanks to our precisely controlled cable manufacturing process and highly skilled & experienced technicians, "RF-Coaxial" is able to offer phase matched cable assemblies up to 110 GHz matched in a pair, or in a set to meet tolerance such as +/- 2ps to 67 GHz or +/-4 degree through 18 GHz.

Depending on the application, a variety of cable series available in phase match:

- RPL series–Ultra-low Loss Phase and Amplitude Stable Flexible Cable
- RFL series–Long Flex Life Triple-shielding Flexible Cable
- REL series–Economical Low Loss Flexible Cable
- RMB series–Tight Bend Triple-shielding Flexible Cable
- RTP series–Temperature Phase Stable Cable

When phase or delay matched cable assemblies are needed, please specify the below requirements:

1) Frequency of operation
2) Required phase match or delay match in ± ps or in ± degree@ x GHz
3) Quantity of cable assemblies in one set which are to be matched
4) Length of cable assemblies
5) Connectors of the assemblies in one set or pair

Engineering Information

Phase Stability Test with Flexure

Phase stability vs. flexure is a measure of the phase change as a result of cable flexing. The phase stability can be affected by the following factors:

- Cable material and construction
- Assembly technique
- Cable bend radius and bend angle
- The number of flexures

"RF-Coaxial" performs the test of Phase Stability of Cable Assembly in below procedures.

1. Initial Test

1) Connect the two ports of cable under test(CUT) with VNA, the cable is held in an initial unwrapped position and is measured in the phase and attenuation.

2) Normalize VNA in the phase.

2. Test with cable wrapped 360 degree clockwise

1)Disconnect the CUT cable and wrap it 360 degree clockwise around a mandrel(diameter is ten times of cable outer diameter).

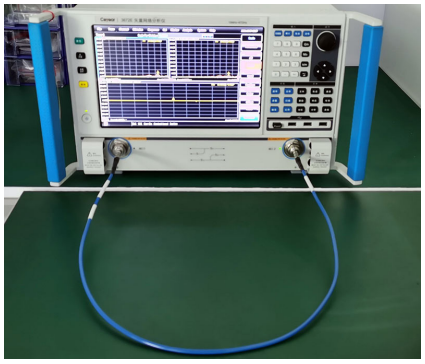
2) The CUT cable is held in such position for measurement, record the max phase and attenuation change over frequency range.

3. Test with cable returned to original unwrapped position

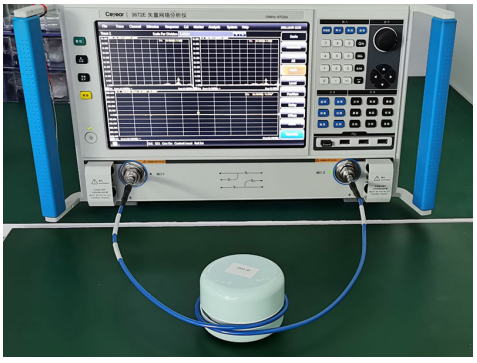
1) Disconnect the CUT cable and return it to its original unwrapped position.

2) The CUT cable is held in such position for measurement, record the max phase change.

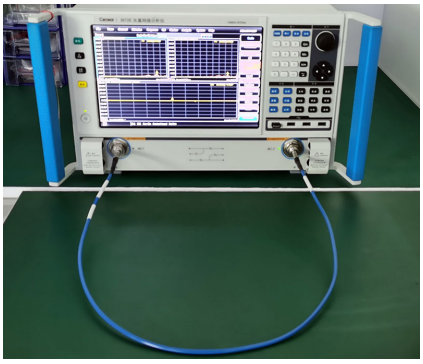
3) The worst-case phase variation in the above procedure is recorded as the phase stability value.



1. Initial Test



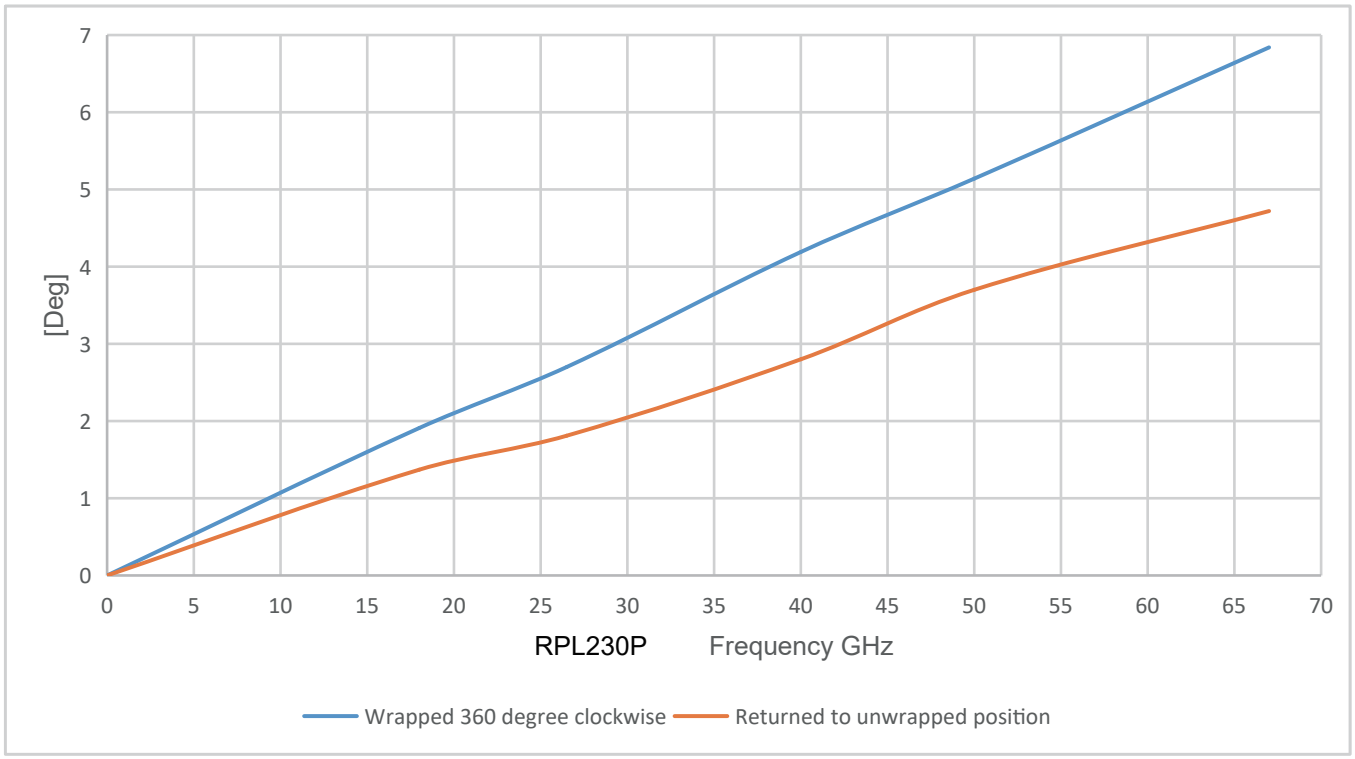
2. Wrapped 360 degree clockwise

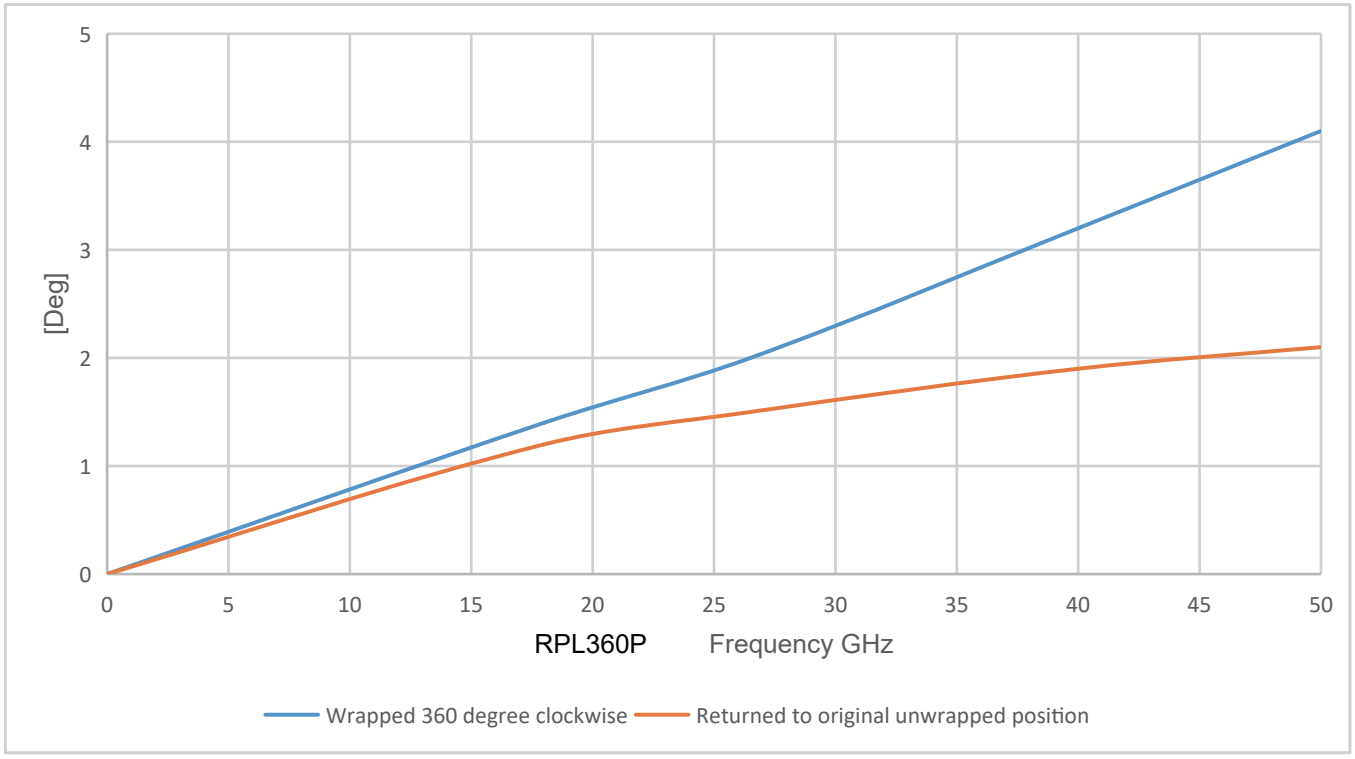


3. Returned to unwrapped position

Engineering Information

Test Data on Phase Stability with Flexure





Phase Stability Test over Temperature

Phase stability vs. temperature is a measure of the signal speed variation when the cable is exposed to different temperatures. The temperature variation will induce the change of the dielectric constant εr, mechanical length, material character which will cause its phase variation. This variation can be unidirectional or multidirectional. The phase variation is characterized by the temperature coefficient of phase η_t, and the maximum variation of temperature coefficient of phase $\Delta|\eta|_{max}$

$$\eta_t = (\varphi_{25\,C} - \varphi_t) / \Phi_{25\,C} \qquad \Delta|\eta|_{max} = |\eta_{max} - \eta_{min}|$$

where

$\varphi_{25\,C}$ is the phase at temperature 25℃ , in (°)
φ_t is the phase at temperature t, in (°)
$\Phi_{25\,C}$ is the total phase at 25℃ , in (°)
$\Delta|\eta|_{max}$ is the maximum phase variation coefficient, in ppm

Test Equipment
A vector network analyzer (VNA), a temperature chamber.

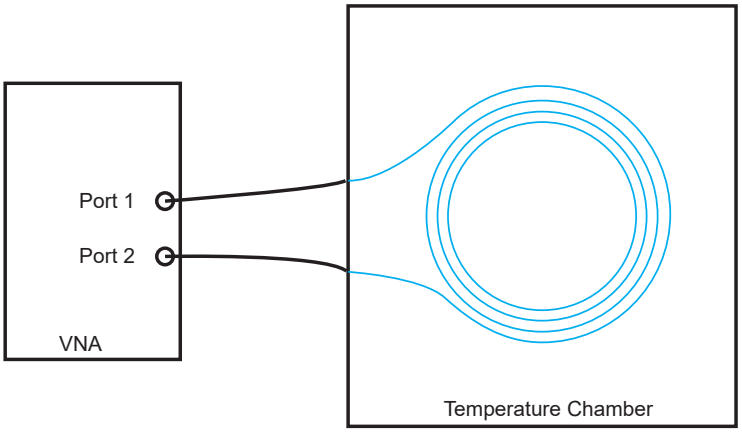
Test Sample
The test cable shall be 3 m long and terminated with suitable connectors at each end.

Test Procedure
1.Test sample shall be put into a temperature chamber in loose coils with the diameter not less than 10 times the cable's minimum static bending radius. Adjust temperature of the chamber for 6 cycles and maintain at least 30 min at each limit temperature (85℃ and -55℃).

2.Set the temperature chamber to 85℃ and maintain 10 min at least when it reaches the temperature. Connect Test sample with the VNA, test $\Phi_{25\,C}$ and $\varphi_{25\,C}$.

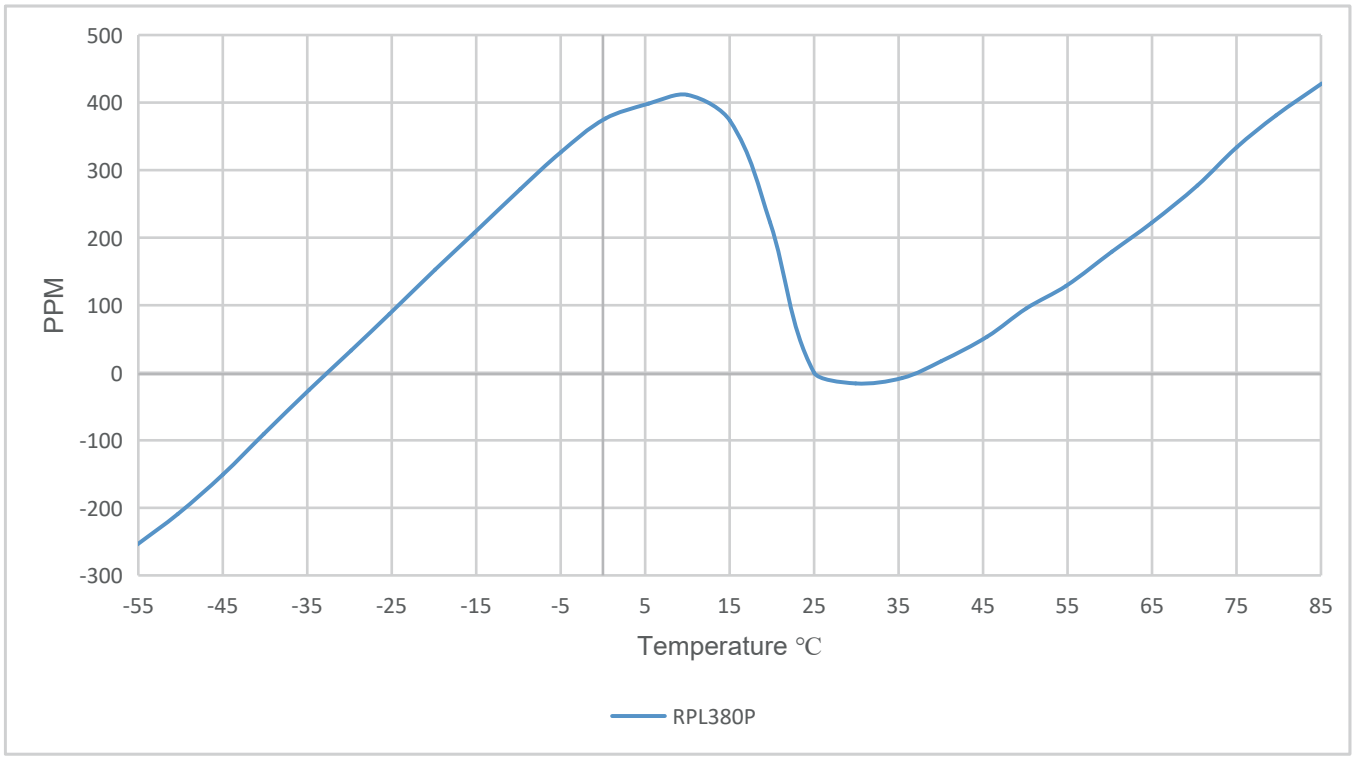
3.Adjust the temperature of the chamber from the lowest temperature -55 ℃ to each higher temperature until to the maximum temperature 85℃ , and record φ_t .

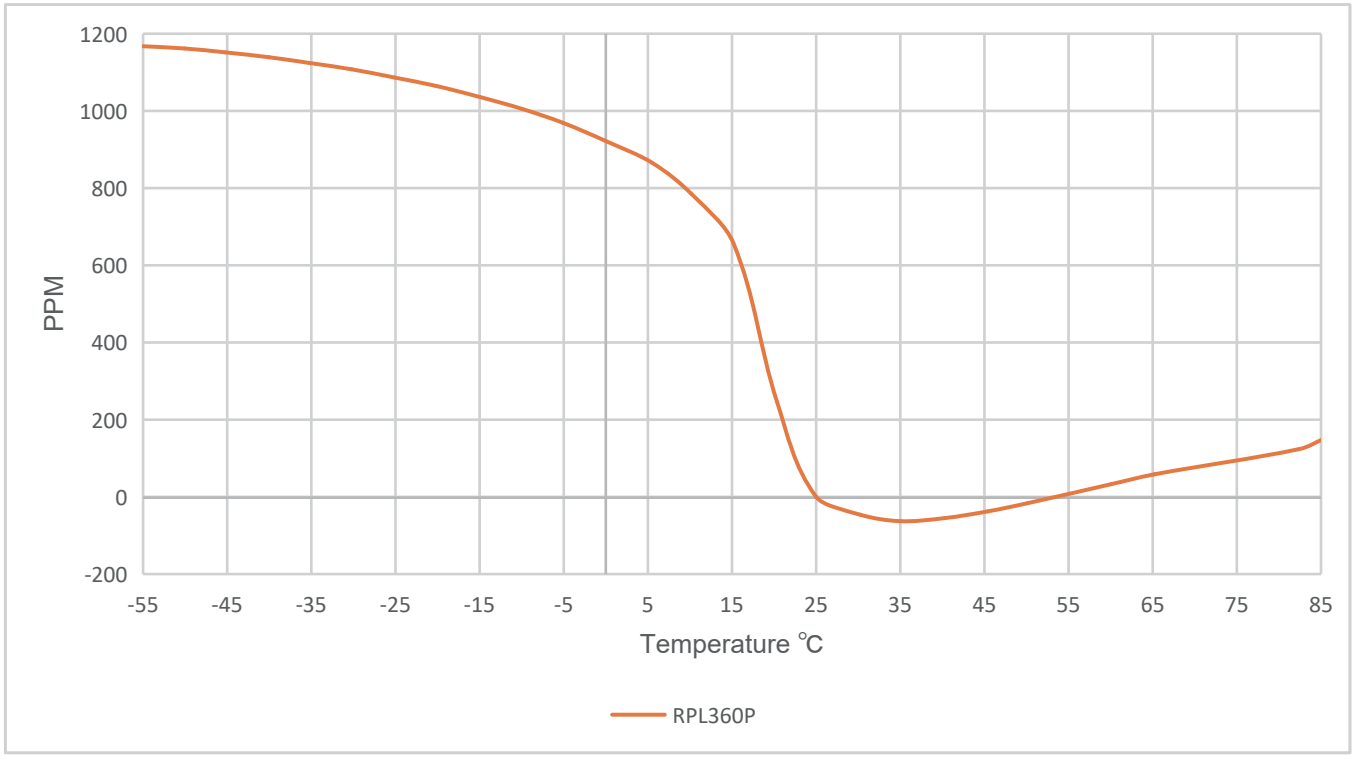
4.Use each η_t and temperature t draw the curve of phase variation with temperature at specified frequency f.



Engineering Information

Test Data on Phase Stability vs Temperature





Engineering Information

Phase Matching of Cable Assemblies

Phase matching is a term generally used to describe two or more cable assemblies with the same electrical length. Normally two specifications are used for phase matched cables assemblies:

1. Time Delay Match

Measure the time delay of each cable assembly by VNA, mark the time delay data typically at the middle point of the frequency range.

For example, a pair of 4 pcs cable assembly matched as DC-67GHz, time delay +/-2ps. Typical phase matching data as in below table.

S/N	01 Cable	02 Cable	03 Cable	04 Cable
Measured Delay	4048.8ps@33.5GHz	4048.9ps@33.5GHz	4047.7ps@33.5GHz	4049.3ps@33.5GHz
* Result	Max: 4049.3ps, Min:4047.7ps, Range:1.6ps(±0.8ps), Judgement: Pass			

Notes:

* When the range of min & max data is within the phase match limit, it is judged Pass.

2. Electrcal Length Match n Degrees at a Specified Frequency

Measure the phase of each cable assembly by VNA across the required frequency range.

For example, a pair of 4 pcs cable assembly matched as DC-26.5GHz, +/-5 degree. Typical phase matching data as in below table.

S/N	01 Cable	02 Cable	03 Cable	04 Cable
* Measured Phase	0 degree	0.9 degree	2.0 degree	-1.1 degree
** Result	Max: 2.0 degree, Min:-1.1 degree, Range:3.1 degree(±1.6 degree), Judgement: Pass			

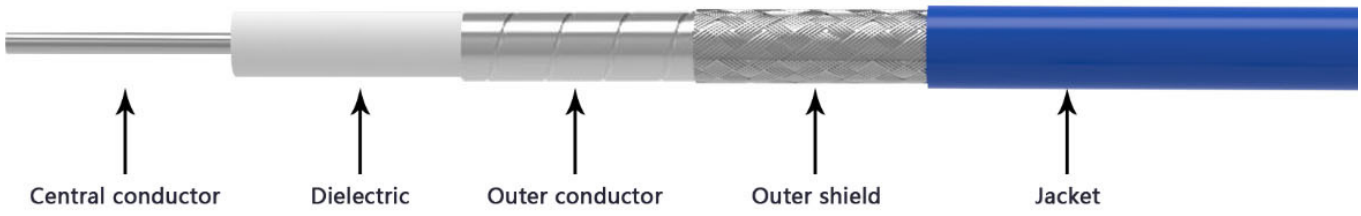
Notes:

* Using S/N 001 as reference cable, phase of which is normalized on VNA. Measuring the phase for each of the rest cables.

** When the range of min & max data is within the phase match limit, it is judged Pass.

Engineering Information

Typical Cable Structure



Center Conductor(Silver Plated Copper)

1.With equal size, solid center conductor cables tend to be more amplitude stable with flexing, stranded center conductor cables tend to be more phase stable with flexing.

2. Stranded center conductor cable is more flexible and endurable than solid center conductor cables under repeated bending.

3. With the same structure, material and processing, cables with thicker diameter center conductor features better attenuation and higher power handling than cables with thinner diameter center conductor.

Dielectric

A microporous low density PTFE dielectric cable will typically have better phase stability, lower loss and higher temperature handling than a solid PTFE or foamed FEP dielectric cable.

Outer Conductor

- Outer conductor in silver plated copper braiding features low loss, long flex life.
- Outer conductor in silver plated copper taping features ultra low loss, phase and amplitude stability
- Outer conductor in aluminum foil features lower cost, low loss.

Shielding

Silver plated copper wire braiding contributes to mechanical strength and additional RF shielding.

Jacket

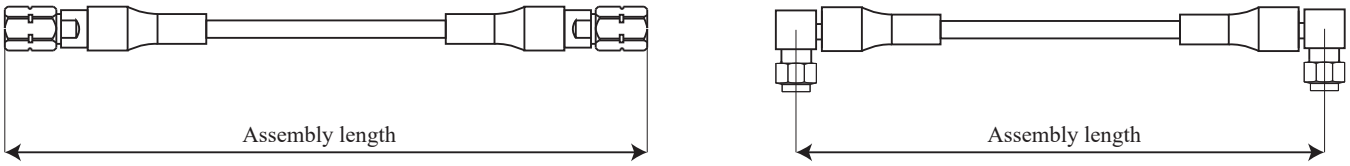
- FEP jacket is high temperate and chemical resistant, operating -65 to 200℃ .
- PUR jacket is super flexible, operating to 85℃ only.
- PTFE jacket is very flexible, operating to 250℃ .

Engineering Information

General Assembly Information

Length definition

1. For straight connectors, the assembly length is measured from one connector end to the other connector end, for right angle connectors, use the pin center-line as shown in below drawing.
2. For non-phase matched cable assemblies, standard length tolerance is ±1.5% for cables over 50 cm. For cables less than 50 cm, length tolerance is ±5mm.



Care and handling instructions

1.Avoid kinking cables when straightening from a coil or reel.
2. Choose the installation routing using the largest bend radius possible. Small bend radius may affect electrical performance. Exceeding the specified limits during the installation process could cause a permanent degradation.
3. Avoid twisting microwave cable assemblies. Torsion of this type of assembly can alter the relative diameters of cable layers and affects the electrical characteristics.
4. When mating connectors with a screwed interface always hold the connector bodies and turn only the coupling nut. This avoids twisting the cable and ensures minimum wear on the connector pins.
5. Do not exceed the specified torque. Recommended torque value for S/Steel SMA and 2.92mm connector installation is 8 in lbs.

Warranty

All “RF-Coaxial” cable assemblies have a limited 4-6 months warranty subject to “RF-Coaxial” review. We will repair or replace the cable assemblies at its option if the cable assemblies fail within four-six months of shipment. This guarantee excludes damage from misuse or abuse.

Frequently Asked Questions

Does “RF-Coaxial” offer cable assembly from stock?

Our standard raw cables and commonly used connectors(1.85mm/2.4mm/3.5mm/2.92mm/SMA/SMP/Type N) are in stock, cable assembly lead time is typically 1 week for any lengths. No MOQ.

Can “RF-Coaxial” provide raw cables and cable connectors besides cable assembly?

Yes, apart from cable assemblies, we are happy to sell either bulk cables or cable connectors to suit each customer’s needs.

How to choose a cable assembly properly?

1. “RF-Coaxial” has uploaded raw cable data sheets on our website, from which you can check the cable diameter, frequency range and electrical performance etc.
2. If you are not sure which cable is fitting, consult with our sales representative.
3. Upon deciding on the raw cable P/N, connectors, length, “RF-Coaxial” will create a specific data sheet for your reviewing.

How to calculate the insertion loss of cable assembly?

1. Check our raw cable data sheets where you can find the typical attenuation data for 1 meter raw cable over full operating frequency range. Max attenuation is 1.1 times of typical attenuation. For 0.5 meter, dividing 2 by using the insertion loss of 1 meter.
2. Insertion loss per straight connector is estimated as 0.04dB x SQRT Freq(GHz). Insertion loss per right angle connector is estimated as 0.08 dB x SQRT Freq(GHz).
3.The whole cable assembly loss is a combination of raw cable loss plus the loss of two connectors.

Can “RF-Coaxial” provide phase matched cable assembly?

Yes, “RF-Coaxial” offers phase matching for RPL series, REL series and other cable series. Please refer to page 37 for phase-matched cable assemblies.

Can “RF-Coaxial” provide custom cable assembly?

Yes, we are capable of building customized cable assembly in below but not limited to these aspects:
1. Custom length. For example even it is only 6cm including two connectors.
2. Custom connectors. For example one end is N female with 4 hole flange, the other end is stainless steel right angle SMA male.
3. Specially strengthened heat shrink boot to better protect the neck point.
4. Jacket or armor with capability of waterproof, crush resistance, corrosion resistance.
5. Microwave flexible cables with ultra low insertion loss, for example, 40GHz attenuation less than 2.2dB for 1 meter.

What is RF Coaxial’s cable RF shielding effectiveness?

Most of our flexible cables have –90 dB minimum shielding from 1 to 18GHz. However, cable assembly shielding effectiveness can be limited by the connector design.

What is RF Coaxial’s cable characteristic impedance?

Our standard cable characteristic impedance is 50 ohm +/-2 ohm.