

# Test assemblies

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## Test leads for Test+Measurement set-ups

The best measurement set-up is only as good as its weakest link. To obtain reliable and reproduceable measurement results, particular care must be taken in selecting the components required for the measurement set-up.

HUBER+SUHNER's extensive range of high quality test leads are matched to the various needs in the field of test and measurement. All these products are distinguished by their high performance and stable characteristics – the result of years of experience in the development and production of radio frequency components.

### Sucotest 110

Reliable microwave test cable assemblies for consistent, repeatable measurements up to 110 GHz



### Sucotest 18A

The test lead for harsh environment up to 18 GHz – precision at a constant high level



### Sucotest 18

The test lead up to 18 GHz – for the highest standard of measurement



### TL-8A

The test lead for component and equipment testing up to 8 GHz



### TL-P

High flexible test lead for passive intermodulation (PIM) and return loss for frequency up to 4 GHz



# Sucotest 110

## microwave test cable assemblies

Reliable microwave test cable assemblies for consistent, repeatable measurements

- Dependable electrical performance up to 110 GHz
- Excellent amplitude and phase stability with flexure, crush and torque resistance
- Superior return loss
- Rugged construction for extended service life
- Stock assemblies available in 6, 12, and 18-inch lengths, with male and female 1.0 mm connectors



## Ruggedized design for exceptional performance

Connectors	1.0 mm (male/female)
Velocity of propagation (%)	70
Return loss (dB)	Typ. 19.0 Min. 14.7
Insertion loss (dB/m)	Typ. 19.8
Amplitude stability vs. flexure (dB)	Typ. $\pm 0.15$ Max. $\pm 0.2$
Phase stability vs. flexure ( $^{\circ}$ )	Typ. $\pm 10$ Max. $\pm 20$
Flex cycles	Typ. 15.000

## Cable assembly configurations available from stock

Cable assembly configurations available from stock	Item	Connector types	Length	Return loss	Insertion loss
ST110_11PC10_11PC10_6in	85229047	1 mm male / 1 mm male	6 inch / 152 mm	min. 14.7 dB	max. 3.7 dB
ST110_11PC10_11PC10_12in	85229046		12 inch / 305 mm		max. 6.35 dB
ST110_11PC10_11PC10_18in	85229048		18 inch / 457 mm		max. 9.0 dB
ST110_11PC10_21PC10_6in	85229043	1 mm male / 1 mm female	6 inch / 152 mm		max. 3.7 dB
ST110_11PC10_21PC10_12in	85229039		12 inch / 305 mm		max. 6.35 dB
ST110_11PC10_21PC10_18in	85229040		18 inch / 457 mm		max. 9.0 dB
ST110_21PC10_21PC10_6in	85229041	1 mm female / 1 mm female	6 inch / 152 mm		max. 3.7 dB
ST110_21PC10_21PC10_12in	85229044		12 inch / 305 mm		max. 6.35 dB
ST110_21PC10_21PC10_18in	85229045		18 inch / 457 mm		max. 9.0 dB

# Sucotest 18A

## The test lead for harsh environment up to 18 GHz – precision at a constant high level

### Product description

Sucotest 18A armoured test assemblies offer excellent electrical performance (low insertion loss combined with unique stability and excellent return loss) for heavy duty, outdoor and harsh environment measurements up to 18 GHz.

Sucotest 18A armoured test assemblies are ideal for testing wireless communication infrastructures, defense and ground systems and in daily use in components and assembly shops.



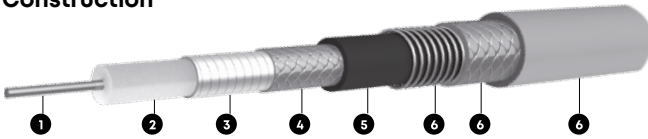
### Product features

- Impedance 50 Ω
- Applicable up to 18 GHz
- High flexibility in spite of armoring
- Phase and loss stability with flexure
- Crush-, torque- and kink-resistant
- Waterproof IP68

### Recommended connectors

ST_18A	N, 7/16
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### Construction



Cable	Inner conductor ①	Dielectric ②	Outer conductor ③ ④	Jacket ⑤	Ruggedisation ⑥	Outer diameter mm
Sucotest_18A	Cu Ag strand-low loss	LD-PTFE	CuAg tape CuSn braid	FEP	stainless steel/PUR, blue	10.3

### Technical data

Cable	Operating frequency	Velocity of propagation	Weight	Min. bending radius for ± 180°	Temperature range
	GHz	%	g /m	mm	°C
Sucotest_18A	18	77	175.0	50.0	-40 to +85

### Available connectors

Connector	Series, pattern	HUBER+SUHNER type	Cable	Operating frequency GHz	VSWR per connector
7/16	straight cable plug	11_716-403	ST_18A	7.5	1.14
	straight cable jack	21_716-403		7.5	1.14
N	straight cable plug	11_N-468		18	1.14
	straight cable jack	21_N-409		18	1.14

# Sucotest 18A

## Assemblies data

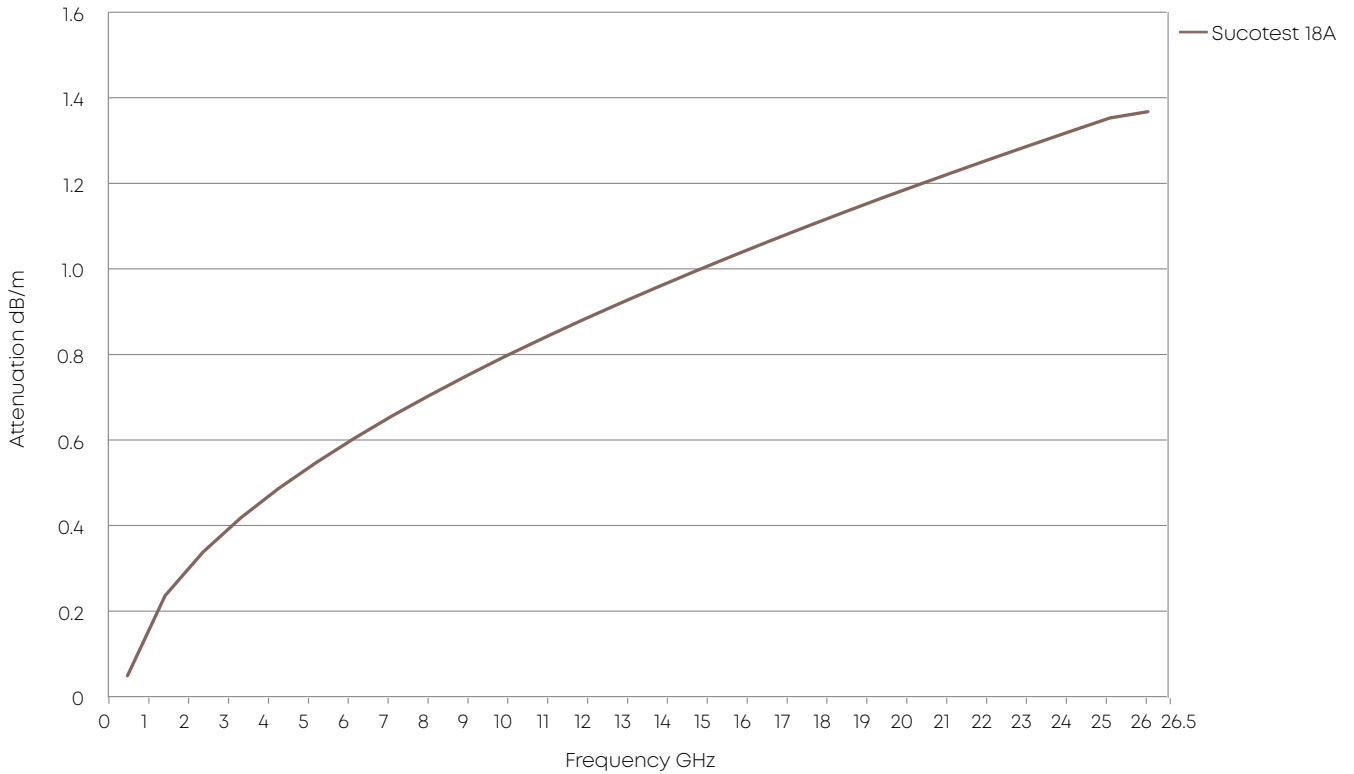
Return loss	N-N	Min. 19 dB up to 18 GHz
Insertion loss (1'500 mm)	N-N	Max. 2.03 dB up to 18 GHz
Insertion loss (3'000 mm)	N-N	Max. 3.84 dB up to 18 GHz
Return loss	716-716 / N-716	Min. 18 dB up to 7.5 GHz
Insertion loss (1'500 mm)	716-716 / N-716	Max. 1.26 dB up to 7.5 GHz
Insertion loss (3'000 mm)	716-716 / N-716	Max. 2.38 dB up to 7.5 GHz

## Mechanical specifications

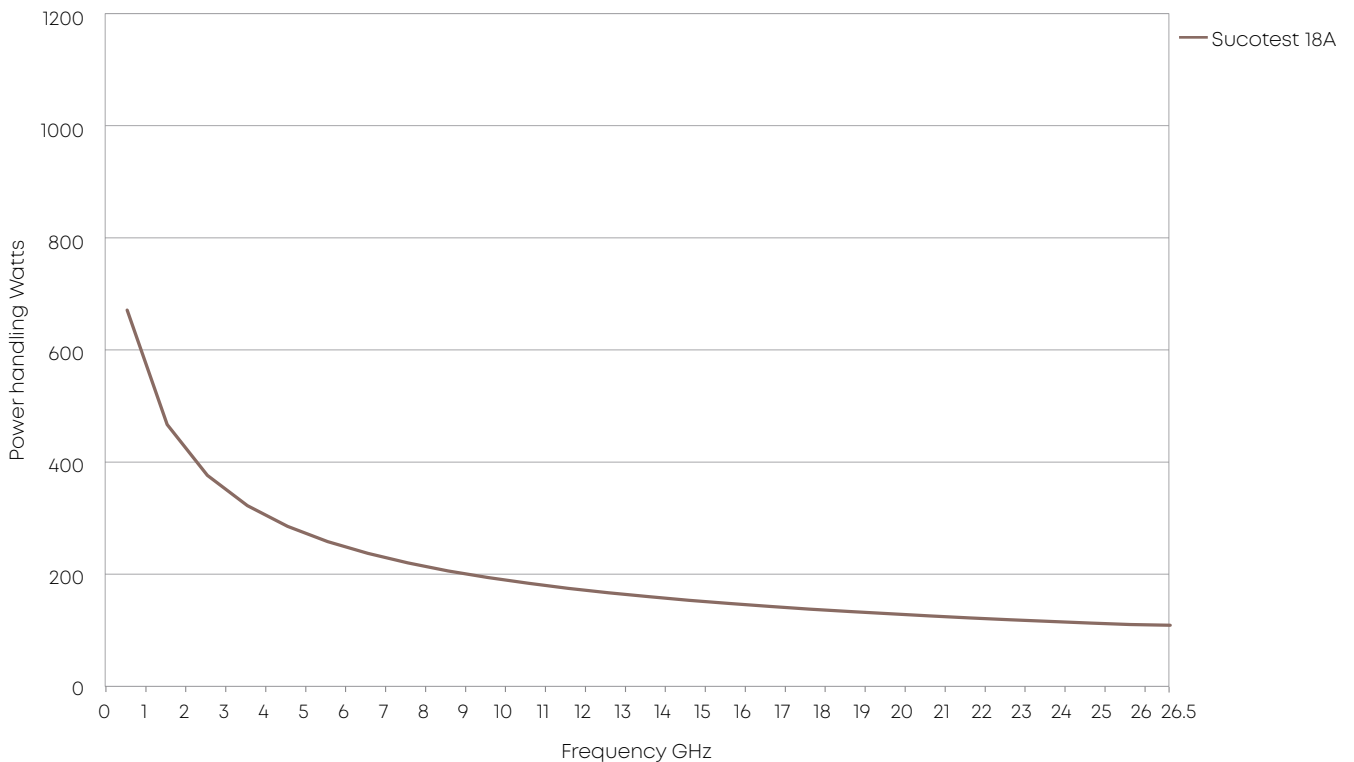
Waterproof	IP68
Flex life (cycles)	100 000
Connector retention force	> 230 N

# Sucotest 18A

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



**Power handling** (maximum values at 25 °C ambient temperature and sea level)



# Sucotest 18

## The test lead up to 18 GHz – for the highest standard of measurement

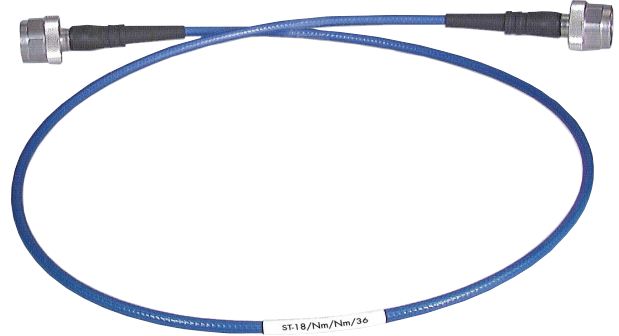
### Product description

Sucotest 18 cable assemblies feature excellent electrical performance (low insertion loss combined with unique loss stability and excellent return loss).

Sucotest 18 is ideal for daily use in components and assembly shops, test labs and automatic test equipment applications.

### Product features

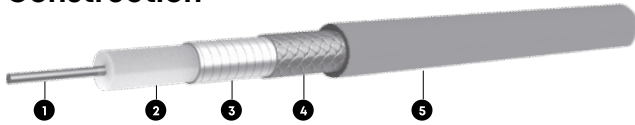
- Impedance 50 Ω
- Applicable up to 18 GHz
- Low insertion loss
- Excellent VSWR
- Unique loss stability
- There is no cable spring back during measurement procedures; the assembly stays in position.



### Recommended connectors

ST_18	SMA, N
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### Construction



Cable	Inner conductor ①	Dielectric ②	Outer conductor ③ ④	Jacket ⑤	Outer diameter
					mm
Sucotest_18	CuAg wire	LD-PTFE	CuAg tape CuSn braid	FEP, blue	4.6

### Technical data

Cable	Operating frequency	Velocity of propagation	Weight	Preferred bending radius	Temperature range
	GHz	%	g /m	mm	°C
Sucotest_18	18	77	53.0	100.0	-55 to +105

# Sucotest 18

## Stock assemblies

HUBER+SUHNER cable type	Item no.	Assembly length (ref.-ref.) (mm/inch)	Min. Return loss up to 18 GHz (dB)	Max. insertion loss up to 18 GHz (dB)		
ST-18/SMAm/SMAm/36 in	84002061	914/36	19	1.51		
ST-18/Nm/Nm/36 in	84002060					
ST-18/SMAm/Nm/36 in	84004594					
ST-18/SMAm/SMAm/48 in	84003373	1219/48		19	1.95	
ST-18/Nm/Nm/48 in	84003372					
ST-18/SMAm/Nm/48 in	84004006					
ST-18/SMAm/SMAm/72 in	84004007	1829/72			19	2.85
ST-18/Nm/Nm/72 in	84004070					
ST-18/SMAm/Nm/72 in	84004595					

Other lengths on request with minimum order quantity of 50 pcs.

# TL-8A

## The test lead for component and equipment testing up to 8 GHz

### Product description

TL-8A assemblies are designed for testing components or equipments up to 8 GHz with network analyser (NA). This economical assembly family is made with a PE foamed double screened cable and protected with an armouring using a moulded cable entry. The excellent electrical performance combined with a high mechanical endurance is ideal for use in test labs and in operations.

### Product features

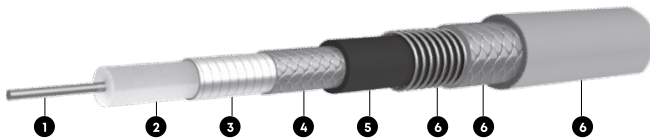
- Impedance 50  $\Omega$
- Applicable up to 8 GHz
- High mechanical endurance
- Excellent insertion and return loss
- High mating cycle
- N connector with quick-lock nut
- Excellent performance to price ratio
- Free of halogen



### Recommended connectors

TL-8A	SMA, N
	Other connectors available on request.

### Construction



Cable	Inner conductor ①	Dielectric ②	Outer conductor ③ ④	Jacket ⑤	Ruggedisation ⑥	Outer diameter mm
TL-8A	CuAg wire	SPE	CuAg braid	LSFH	stainless steel/PUR, blue	10.3

### Technical data

Cable	Operating frequency	Velocity of propagation	Weight	Preferred bending radius	Temperature range
	GHz	%	g / m	mm	°C
TL-8A	8	82	225.0	100.0	-5 to +85

# TL-8A – ... -51

## Technical data

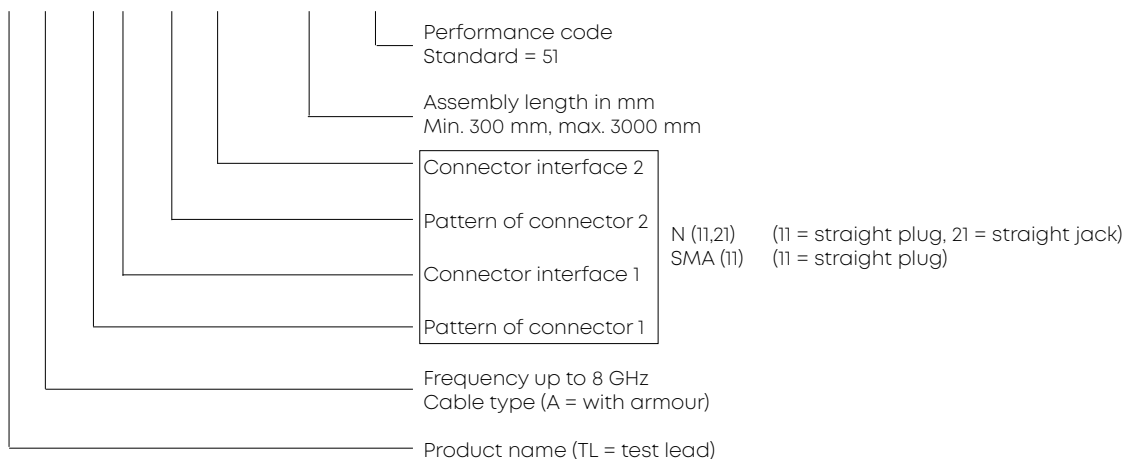
Return loss ≤ 1'000 mm	Min. 22 dB up to 8 GHz
Return loss ≤ 1'500 mm	Min. 21 dB up to 8 GHz
Return loss ≤ 3'000 mm	Min. 20 dB up to 8 GHz
Attenuation	Typ. 1.24 dB/m @ 8GHz
Waterproof	No gasket on interface
Durability (matings)	> 3000 cycles
Assembly length	Min. 300 mm, max. 3'000 mm

## Standard assemblies

HUBER+SUHNER cable type	Item no.	Assembly length (mm)	Min. Return loss up to 8 GHz (dB)	Max. insertion loss up to 8 GHz (dB)
TL-8A-11N-21N-01500-51	85021664	1'500	21	2.15
TL-8A-11N-21N-03000-51	85021665	3'000	20	4.25
TL-8A-11N-11N-01000-51	84236772	1'000	22	1.44
TL-8A-11N-11N-01500-51	85006682	1'500	21	1.20
TL-8A-11N-11N-02000-51	84236774	2'000	20	2.85
TL-8A-11N-11N-03000-51	85014502	3'000	20	4.25
TL-8A-11N-11N-00600-51	84236770	600	22	0.88
TL-8A-11N-11SMA-01000-51	85014642	1'000	22	1.44
TL-8A-11N-11SMA-01500-51	85014643	1'500	21	2.15
TL-8A-11N-11SMA-02000-51	85014644	2'000	20	2.85
TL-8A-11N-11SMA-03000-51	85014645	3'000	20	4.25
TL-8A-11N-11SMA-00600-51	85014641	600	22	0.88
TL-8A-11SMA-11SMA-01000-51	85014637	1'000	22	1.44
TL-8A-11SMA-11SMA-01500-51	85014638	1'500	21	2.15
TL-8A-11SMA-11SMA-02000-51	85014639	2'000	20	2.85
TL-8A-11SMA-11SMA-03000-51	85014640	3'000	20	4.25
TL-8A-11SMA-11SMA-00600-51	85014636	600	22	0.88

Other lengths on request with minimum order quantity of 50 pcs.

## TL - 8A - 11 N - 11 SMA - 01500 - 51



# TL-P

## High flexible test lead for passive intermodulation (PIM) and return loss for frequency up to 4 GHz

### Product description

HUBER+SUHNER TL-P assemblies are designed for indoor and outdoor applications where passive intermodulation (PIM) has to be tested.

This assembly family is based on a flexible cable which is optimised up to 4 GHz and protected with a steel armouring. The robust design is completed with a molded protection between connector and cable.

### Product features

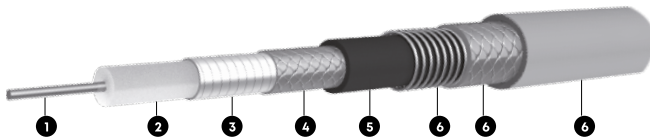
- Impedance 50 Ω
- Applicable up to 4 GHz
- Excellent PIM performance ( $\leq -160$  dBc)
- High mechanical endurance
- Return Loss performance
- High mating cycle (> 2000)
- Highly flexible, rugged and reliable design
- Easy to handle for work in field
- Excellent performance to price ratio



### Recommended connectors

TL-P	7/16, N, 4.3-10 (screw version)
	Other connectors available on request.

### Construction



Cable	Inner conductor ①	Dielectric ②	Outer conductor ③ ④	Jacket ⑤	Ruggedisation ⑥	Outer diameter mm
TL-P	CuAg wire	PTFE	CuAg braid	FEP	stainless steel/PUR, blue	10.3

### Technical data

Cable	Operating frequency	Velocity of propagation	Weight	Preferred bending radius	Temperature range
	GHz	%	g / m	mm	°C
TL-P	4	71	150.0	110.0	-15 to +65

### Available connectors

Connector	Series, pattern	Code	Operating frequency GHz
7/16	straight cable plug	7/16	4
N	straight cable plug	N	4
4.3-10 (screwed)	straight cable plug	431X	4

# TL-P - ... -51

## Technical data

Return loss	Min. 19 dB up to 4 GHz
Passive intermodulation (tested according IEC62037-2)	Min. 160 dBc (117 dBm), 2 x 20W, @ 1.8 GHz
C.W. power (40 °C, sea level)	Min. 280 W up to 4 GHz
Attenuation	Typ. 0.75 dB/m at 2 GHz, 0.9 dB/m at 3 GHz
Shielding effectiveness	Min 120 dB
Waterproof	IP 67
Temperature range	-15 °C to +65°C
Durability (matings)	> 2'000 cycles
Bending radius repeated	Min. 50 mm (15x)
Bending radius dynamic	Min. 110 mm, flex life 10'000 bendings +/- 90°

## Standard assemblies

HUBER+SUHNER cable type	Item no.	Assembly length (mm)	Min. PIM (dBc) 1.8 GHz	Min. Return loss up to 4 GHz (dB)	Max. insertion loss up to 4 GHz (dB)
TL-P-11431X-11431X-03000-51	85068157	3'000	-160	19	3.05
TL-P-11431X-11716-01500-51	85029279	1'500			1.58
TL-P-11431X-11716-03000-51	85029280	3'000			3.05
TL-P-11716-11716-01500-51	85027448	1'500			1.58
TL-P-11716-11716-03000-51	85027254	3'000			3.05
TL-P-11716-11N-01500-51	85027450	1'500			1.58
TL-P-11716-11N-03000-51	85027453	3'000			3.05

Other lengths on request with minimum order quantity of 20 pcs.

## TL - P - 11 431X - 11 716 - 01500 - 51

