Ultra-Flexible Test Cable

ULC SMSM+ Series

50Ω DC to 18 GHz

CASE STYLE: NS1992

The Big Deal

- Wideband, DC to 18 GHz
- Minimal performance change versus flexure
- Tight Bend radius of 2.0 inches

Product Overview

Mini-Circuits' ULC-SMSM+ are ultra-flexible cables which provide wideband performance from DC to 18 GHz with low insertion loss and excellent VSWR. The cable is designed for stability of phase and amplitude versus flexure while offering tremendous durability and reliability. Its unique construction of a triple shielded cable with a unique molded boot allows the cable to have the greatest of flexibility and yet handle the demanding lab environments where constant bending and flexing are required. In addition, they feature SMA-M to SMA-M stainless steel connectors. Available from stock in a variety of lengths to support many different requirements.

Key Features

Feature	Advantages
Ultra-Flexible 0.75 inch static bend radius 2.0 inch dynamic bend radius	Supports a wide range of test measurements in which tight bends are needed to be made.
Excellent stability of phase and insertion loss versus flexure	ULC-series test cables have been tested in bend radii as tight as 2.0 inches to qualify minimal change in insertion loss, insertion phase, and VSWR, providing reliable performance in a wide range of configurations.
Performance qualified to 20,000 flexures	Like all Mini-Circuits test cables, ULC-series models have been performance qualified up to 20,000 bend cycles, ensuring outstanding durability and extra long life.

Ultra-Flexible Test Cable

ULC-6FT-SMSM+

50Ω 6FT DC to 18 GHz

CASE STYLE: NS1992-6

Connectors	Model
SMA Male	ULC-6FT-SMSM+

+RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Maximum Ratings

Operating Temperature	-55°C to +85°C
Storage Temperature	-55°C to +85°C
Power Handling at 25°C	210W Max. at 2 GHz 120W Max. at 6 GHz 82W Max. at 12 GHz 67W Max. at 18 GHz

Permanent damage may occur if any of these limits are exceeded.

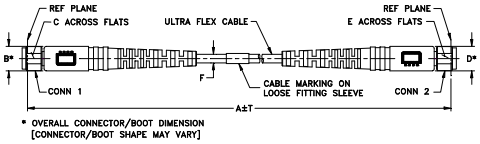
Features

- Ultra flexible design for easy connection & bend radius
- Extra rugged construction with strain relief for longer life
- Triple shield cable for excellent shielding effectiveness
- Stainless steel SMA connectors for long mating-cycle life
- 6 month guarantee*

Applications

- Test and measurement
- Research & development labs
- Environmental & temperature test chambers
- Field RF testing

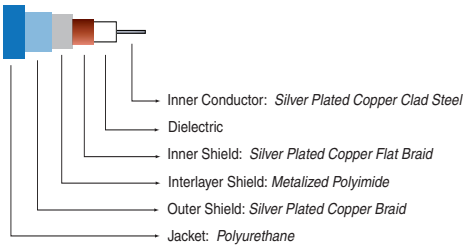
Outline Drawing



Outline Dimensions (inch / mm)

A		B	C	D	E	F	T		wt
Feet	Meters	.426	.313	.426	.313	.150±.004	Feet	Meters	grams
6.00	1.83	10.82	7.95	10.82	7.95	3.81±0.10	0.18	0.05	82

Cable Construction



Connectors:
- *Passivated stainless steel (Body & Hex Nut)*
- *Gold plated beryllium copper center contacts*
- *PTFE Dielectric*

FLEX TEST™ *20K stress flex's*

Product Guarantee

Mini-Circuits® will repair or replace your test cable at its option if the connector attachment fails within six months of shipment. This guarantee excludes cable or connector interface damage from misuse or abuse.

Electrical Specifications at 25°C

Parameter	Condition (GHz)	Min.	Typ.	Max.	Unit
Frequency Range		DC		18	GHz
Length[1]			6		ft
Insertion Loss	DC-2	—	1.5	1.7	dB
	2-6	—	2.7	3.0	
	6-12	—	4.1	4.3	
	12-18	—	5.2	5.6	
Return Loss	DC-2	17	23	—	dB
	2-6	17	22	—	
	6-12	17	19	—	
	12-18	17	19	—	

1. Custom sizes available, consult factory.

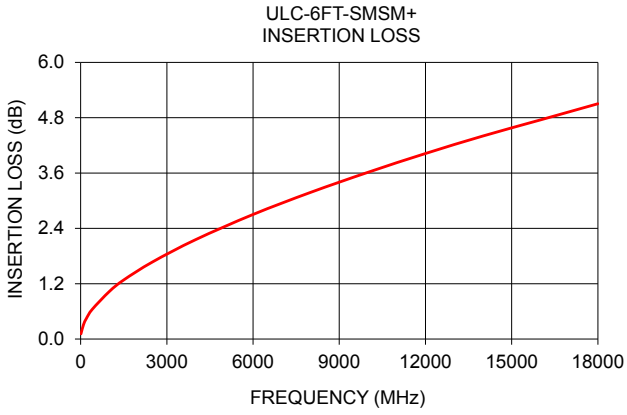
Performance Change vs. Flexure (Typical)[2]

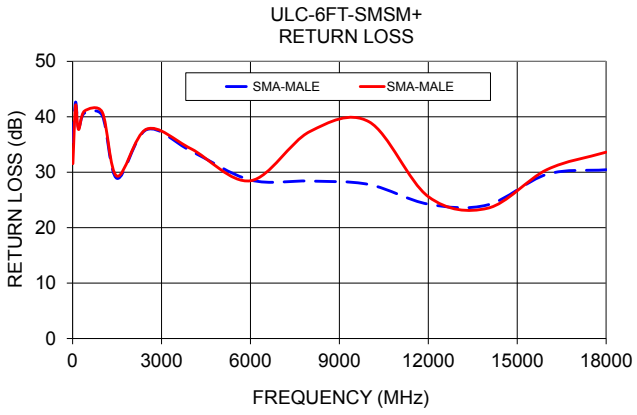
Parameter	Condition (GHz)	Bend Radius (inches)			Units
		10.0	3.25	2.00	
Insertion Loss[3]	DC - 2	0.00	0.00	0.01	dB
	2 - 6	0.00	0.01	0.01	
	6 - 12	0.01	0.02	0.03	
	12 - 18	0.01	0.02	0.03	
Insertion Phase[3]	DC - 2	0.06	0.05	0.21	Deg
	2 - 6	0.17	0.18	0.69	
	6 - 12	0.36	0.42	1.45	
	12 - 18	0.49	0.73	2.37	
VSWR[3]	DC - 2	0.00	0.00	0.00	:1
	2 - 6	0.00	0.00	0.00	
	6 - 12	0.01	0.01	0.02	
	12 - 18	0.01	0.01	0.02	

2. Performance change versus flexure with a 3 ft cable 360° around a 4" diameter mandrel.
3. Absolute values normalized to the reference position 0. See AN-46-003 under Associated Application Notes

Typical Performance Data

Frequency (MHz)	Insertion Loss (dB)	Return Loss (dB)	
		SMA MALE 1	SMA MALE 2
10	0.11	35.45	31.54
100	0.31	42.64	42.03
200	0.45	38.05	37.70
400	0.64	40.67	41.03
1000	1.03	40.23	40.84
1500	1.28	28.89	29.29
2500	1.67	37.69	37.78
4000	2.15	33.82	34.22
6000	2.70	28.60	28.46
8000	3.18	28.41	37.33
10000	3.62	27.78	39.10
12000	4.02	24.24	25.59
14000	4.40	24.11	23.50
16000	4.75	29.62	30.46
18000	5.10	30.45	33.62





Additional Notes

A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.

B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.

C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

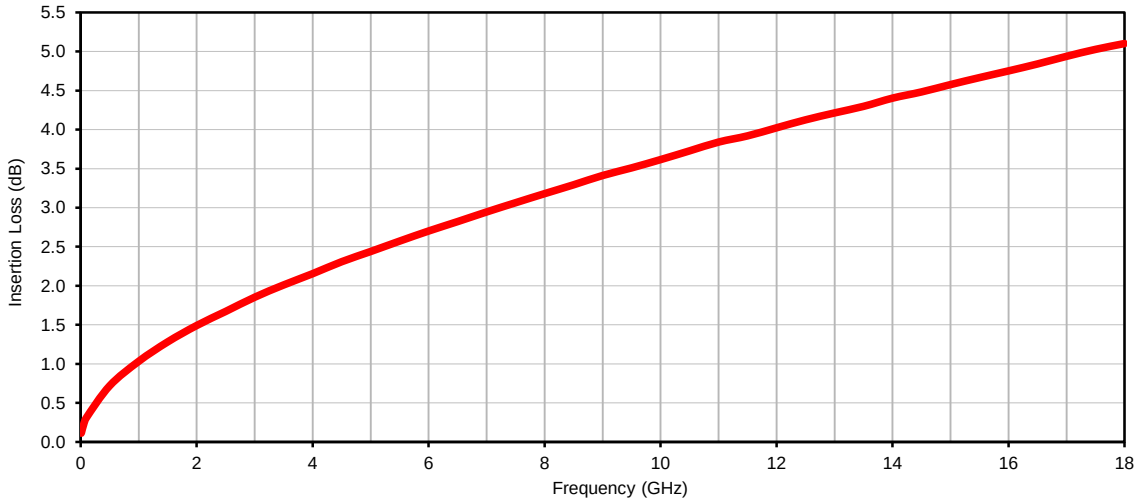
Ultra Flexible Test Cable, SMA-Male/SMA-Male ULC-6FT-SMSM+

Typical Performance Data

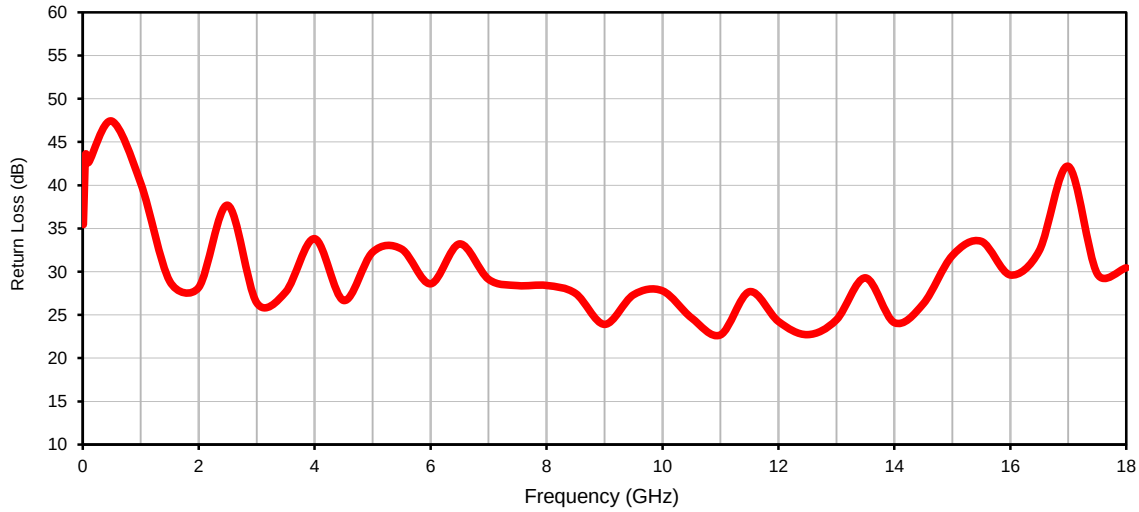
FREQUENCY (GHz)	INSERTION LOSS (dB)	SMA-MALE 1 RETURN LOSS (dB)	SMA-MALE 2 RETURN LOSS (dB)
0.01	0.11	35.45	31.54
0.05	0.22	43.56	43.35
0.1	0.31	42.64	42.03
0.5	0.72	47.42	44.38
1.0	1.03	40.23	40.84
1.5	1.28	28.89	29.29
2.0	1.49	28.17	28.74
2.5	1.67	37.69	37.78
3.0	1.85	26.41	26.20
3.5	2.01	27.64	27.45
4.0	2.15	33.82	34.22
4.5	2.31	26.67	26.38
5.0	2.44	32.26	30.53
5.5	2.57	32.61	33.40
6.0	2.70	28.60	28.46
6.5	2.82	33.22	33.99
7.0	2.95	29.12	36.28
7.5	3.06	28.39	29.79
8.0	3.18	28.41	37.33
8.5	3.29	27.49	32.45
9.0	3.41	23.91	26.10
9.5	3.51	27.33	29.29
10.0	3.62	27.78	39.10
10.5	3.73	24.66	25.70
11.0	3.84	22.69	23.83
11.5	3.92	27.68	31.10
12.0	4.02	24.24	25.59
12.5	4.12	22.72	23.15
13.0	4.21	24.43	25.06
13.5	4.30	29.29	27.11
14.0	4.40	24.11	23.50
14.5	4.48	26.29	27.70
15.0	4.58	31.87	26.55
15.5	4.67	33.51	26.85
16.0	4.75	29.62	30.46
16.5	4.84	32.44	30.53
17.0	4.94	42.19	26.54
17.5	5.03	29.76	27.02
18.0	5.10	30.45	33.62

Typical Performance Curves

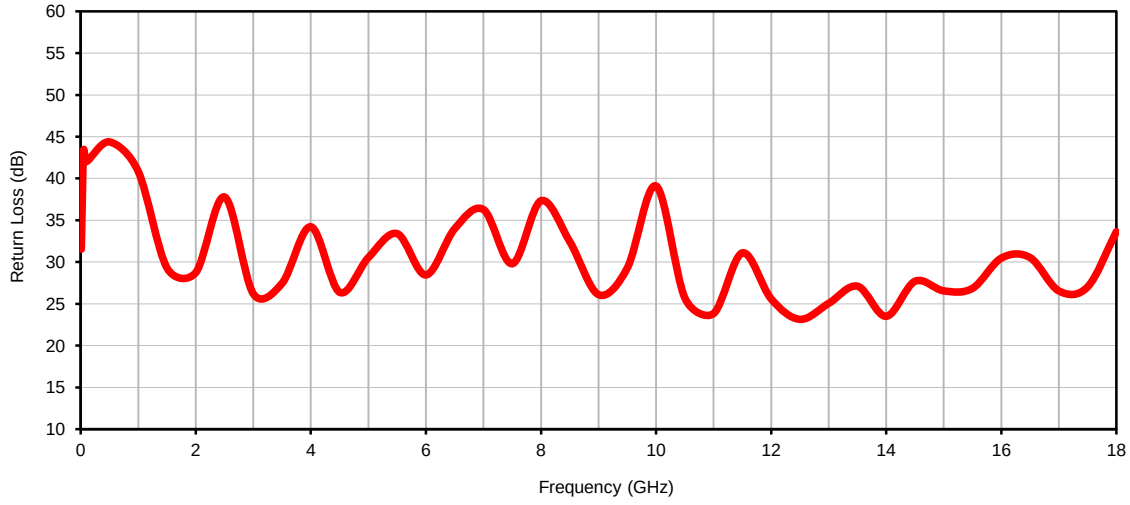
Insertion Loss



SMA-Male 1 Return Loss



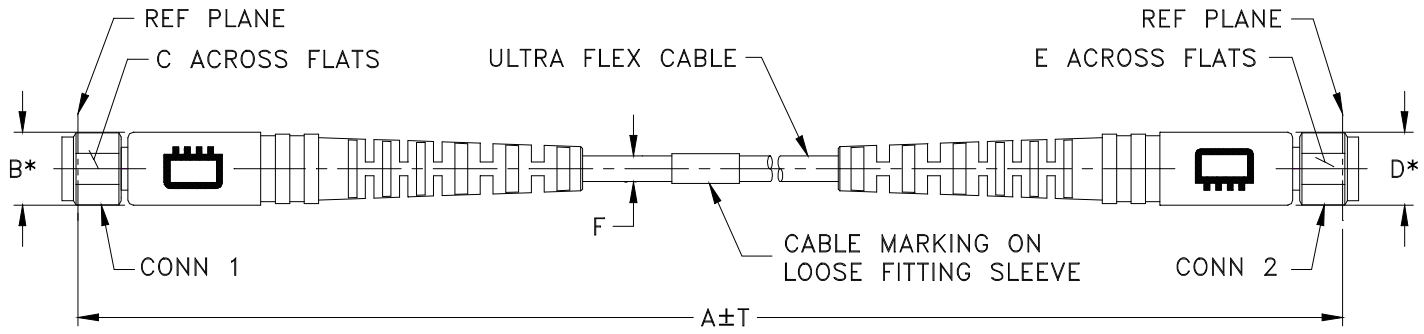
SMA-Male 2 Return Loss



Case Style NS

Outline Dimensions

NS1992



* OVERALL CONNECTOR/BOOT DIMENSION
[CONNECTOR/BOOT SHAPE MAY VARY]

NS1992 SERIES
SMA MALE (CONN-1)
SMA MALE (CONN-2)

CASE STYLE #	A		B	C	D	E	F	T		WEIGHT GRAMS
	FEET	METERS						FEET	METERS	
NS1992-1	1.00	0.30	.426 [10.82]	.313 [7.95]	.426 [10.82]	.313 [7.95]	.150±.004 [3.81±0.10]	.06	0.02	34
NS1992-1.5	1.50	0.46						.06	0.02	39
NS1992-2	2.00	0.61						.06	0.02	44
NS1992-3	3.00	0.91						.09	0.03	53
NS1992-3.28	3.28	1.00						.10	0.03	56
NS1992-4	4.00	1.22						.12	0.04	63
NS1992-6	6.00	1.83						.18	0.05	82
NS1992-6.56	6.56	2.00						.20	0.06	87
NS1992-8	8.00	2.44						.24	0.07	101
NS1992-10	10.00	3.05						.30	0.09	120

Tolerances: 2Pl. ± .03; 3Pl. ± .015

Note:

1. Flexible Coaxial Cable.

Mini-Circuits®
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Mini-Circuits

Environmental Specifications ENV60

All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-55° to 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 85° C Ambient Environment	Individual Model Data Sheet
Thermal Shock	-55° to 100° C, 100 cycles	MIL-STD-202, Method 107, Condition A-3
Mechanical Flexing	20,000 cycles During each cycle, cable flexed from 90° through 0° to -90° and back with a Radii of 3 inches	- - -