

## Harsh Military Applications Ultra Low Loss, Phase Stable

ULL05 series cable sets have been constructed specially for harsh military and defense applications demanding rugged interconnects with lowest loss and high phase stability. Ultra low loss cable and precision stainless steel connectors with split solder sleeves form the basis of this highly durable product.

- Proprietary Triple Shielded Ultra Low Loss Cable conformant to MIL-C-17
- MIL-PRF-39012 conformant connectors

### CROSS REFERENCE

- Radiall SHF5M

### APPLICATIONS

- Radar systems, electronic warfare
- Harsh military and defense system
- Interconnection of LRU's in military systems
- Environmental test chambers

### Electrical Specifications

Impedance	50 Ohms
Velocity of Propagation	80 %
Shielding Effectiveness	Better than -95dB
Capacitance	25 pF/ft    82 pF/m
Frequency Range	DC ~ 32.9 Ghz
Insulation Resistance	> 5000 M Ohms
Phase Stability Vs Flexures (360° wrap on a mandrel of 49.5mm diameter)	<1°/GHz, Typ.±3.6°@18G
Phase Stability Vs Temp. (parts per million, ppm)	<10 ppm/degree (<1500 ppm in -40 ~ +85°)
Phase Stability Vs Temp. (degree/ meter / GHz)	<1° / m / GHz)
Attenuation Stability Vs Temperature	<0.2 % /°C
Attenuation Stability Vs Bending	± 0.2dB



**Insertion Loss**  
 < 0.79dB/m @ 10 GHz  
 < 1.13 dB/m @ 18 GHz

### CONFORMANT MIL STANDARDS

- Cable conforms to MIL-C-17
- Connectors conform to MIL-PRF-39012

### Physical & Mechanical Specifications

Dimensions	inches	mm
Outer diameter	0.208	5.2
Bend Radius (min.)	1	25
Weight	0.061 Kg/m	
Temperature Range	-55° ~ + 150°C	

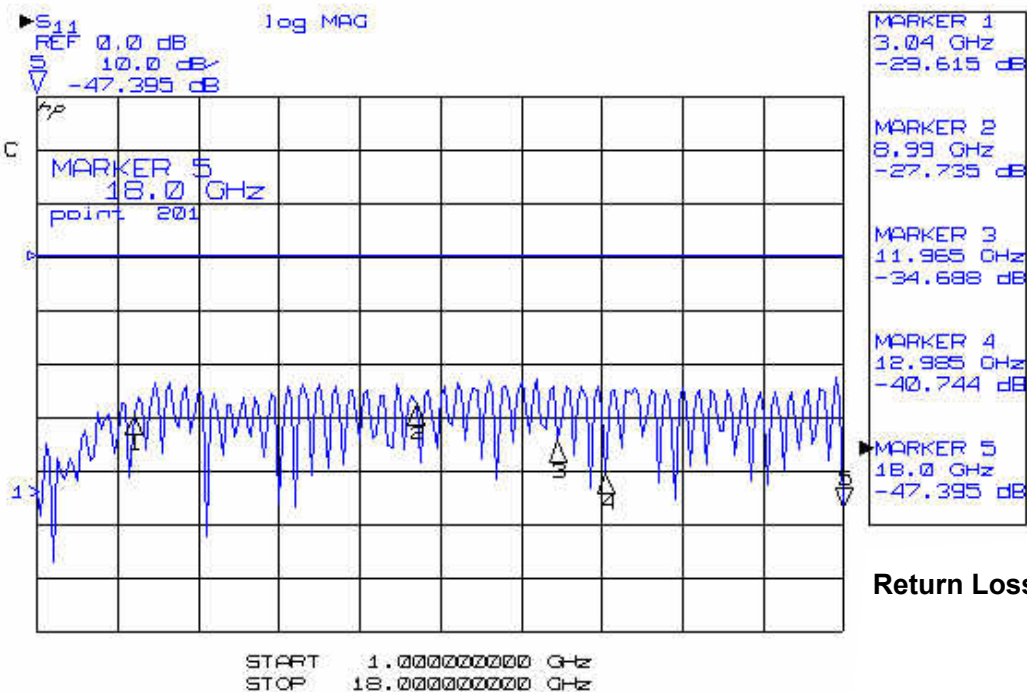
### Attenuation & Power Handling Data

Frequency	Insertion Loss		Av Power Watts
	dB/ft	dB/m	
1 GHz	0.08	0.26	715
2 GHz	0.11	0.37	495
3 GHz	0.14	0.45	400
4 GHz	0.17	0.55	350
6 GHz	0.20	0.65	276
8 GHz	0.21	0.70	240
10 GHz	0.23	0.79	210
12 GHz	0.26	0.87	190
18 GHz	0.33	1.12	150

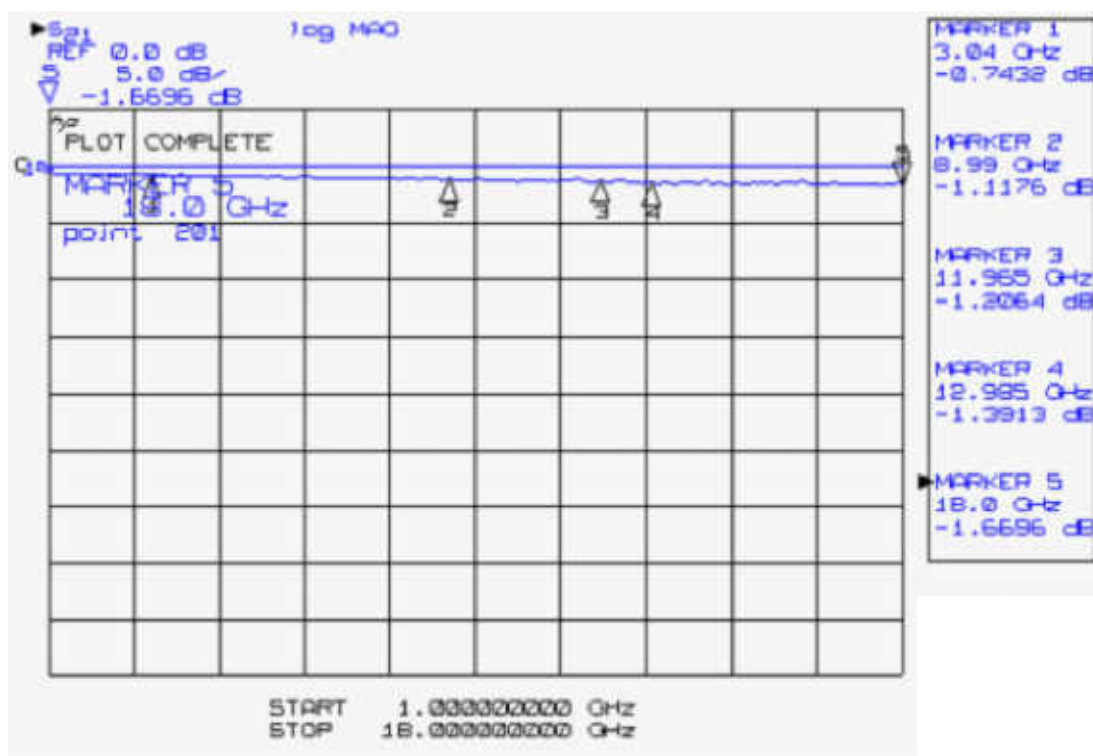
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### Return Loss of 1 meter ULL05 cable set with SMA(M) on both sides



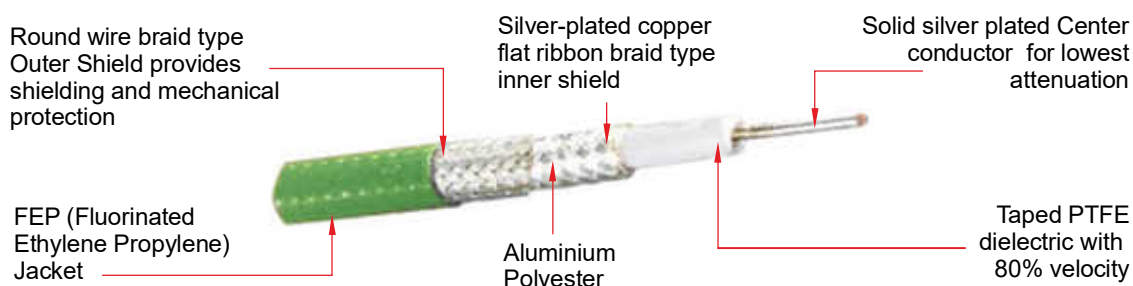
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## Imported Ultra Low Loss, Triple Shielded Hi-Power Cable details



### Ordering Codes Description

ULL05 / (Length) (Connector 1) (Connector 2)  
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**L L L L** **1 2 3** **1 2 3**

<b>L L L L</b>	Length	1 meter = 1M ; 1 feet = 1F
<b>1</b>	Connector Series	SMA = SMA; N = N
<b>2</b>	Male/Female Designator	M = Male ; F = Female
<b>3</b>	Orientation of Connector	ST = Straight ; RA = Right Angle

### Cable Set Ordering Codes

Ordering Code	Length	Insertion Loss (dB) Typical					
		1.5 GHz	3 GHz	6 GHz	9 GHz	12 GHz	18 GHz
SMA (Male) Straight - SMA (Male) Straight (DC to 18 GHz)							
ULL05-0.5-SMA(M/ST)-SMA(M/ST)-M	0.5m	0.33	0.45	0.61	0.74	0.84	1.05
ULL05-1-SMA(M/ST)-SMA(M/ST)-M	1m	0.51	0.70	0.99	1.12	1.25	1.55
ULL05-2-SMA(M/ST)-SMA(M/ST)-M	2m	0.89	1.24	1.74	1.90	2.10	2.70
ULL05-3-SMA(M/ST)-SMA(M/ST)-M	3m	1.26	1.76	2.30	2.65	3.10	3.80
ULL05-5-SMA(M/ST)-SMA(M/ST)-M	5m	2.02	2.81	3.60	4.30	4.80	6.20
ULL05-1-SMA(M/ST)-SMA(M/ST)-F	1 feet	0.27	0.35	0.47	0.56	0.62	0.77
ULL05-2-SMA(M/ST)-SMA(M/ST)-F	2 feet	0.37	0.49	0.69	0.86	0.97	1.15

### Connectors Specifications

Specifications	SMA Connectors
Construction	Solder Cup, Retaining Ring & Front End
Retaining Ring & Front End	Stainless Steel Passivated
Center Conductor	BeCu, Gold Plated
Insulation	PTFE
Gasket	Silicon Rubber
Frequency range	DC~18 GHz
Vibration	As per MIL-STD-202, method 204, test condition D
Mechanical Shock	As per MIL-STD-202, method 213, test condition I
Temperature Cycle	As per MIL-STD-202, method 102A, test condition C

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## Specifications for Ultra Low Loss Cable Assemblies

Length	Connector 1	Connector 2
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- Should be flexible and routable
- Cable should conform to MIL standards MIL-C-17 and Connectors should conform to MIL-PRF-39012

### Electrical Specifications

- Impedance : 50 ohms
- Frequency : DC~18 GHz
- Velocity of Propagation : >76%
- Shielding Effectiveness : better than 90 dB
- Power Handling : > 390 Watts Average @3 GHz  
> 200 Watts Average @10 GHz  
> 135 Watts Average @18 GHz
- Insertion Loss : < 0.17 dB/feet @3 GHz  
< 0.30 dB/feet @10 GHz  
< 0.42 dB/feet @18 GHz
- VSWR : < 1.3 (DC~11 GHz) for SMA straight connectors  
< 1.35 (11 ~ 18 GHz) for SMA straight connectors

### Physical & Mechanical Specifications

- Construction should be triple shielded for low loss
- Inner Conductor : Solid Silver Covered Copper
- Dielectric : Low Density e-PTFE taped
- Inner Shield : Silver Plated Copper Flat Ribbon Tape
- Interlayer : Aluminium Polyester or polyimide tape
- Outer Shield : Silver Plated Copper Braid
- Jacket : Rugged Fluorinated Ethylene Propylene (FEP)
- Overall diameter : < 5.5 mm
- Bending Radius : < 25.4 mm (1 inch)
- Temperature Range : -55°C to +125°C
- Cable-Connector Retention : > 200 N

### Connector Specifications

- Connector Construction : Split solder cup, retaining ring and connector front-end
- Retaining Ring : Stainless Steel, Passivated
- Connector Front-End : Stainless Steel, Passivated
- Center Conductor : Beryllium Copper, Gold Plated
- Insulation : PTFE
- Frequency range : DC~18 GHz
- Should meet test conditions of MIL-STD-202 for vibration, mechanical shock, thermal shock, corrosion, humidity, temperature cycling