

LMR®-195-LLPL Flexible Low Loss Plenum Coax

Ideal for...

- Indoor Plenum Feeder runs
- Drop in replacement for RG-142
- UL/NEC/CSA rated CMP/FT6
- Any wireless application (e.g. LMDS, MMDS, WLL, GPS, LMR, WLAN, WISP, WiMax, SCADA, Cellular, PCS, Paging) requiring an easily routed, low loss RF cable for in-building systems

• **LMR®-LLPL** is an indoor highly fire retarded cable intended specifically for runs within return air handling plenums (e.g. dropped ceilings, raised floors). It has a UL/NEC & CSA rating of ‘CMP’ and ‘FT6’ respectively.

• **Flexibility** and bendability are hallmarks of the LMR-195-LLPL cable design. The flexible outer conductor enables the tightest bend radius available for any cable of similar size and performance.

• **Low Loss** is another hallmark feature of LMR-195-LLPL. Size for size LMR has the lowest loss of any flexible cable and comparable loss to semirigid hard-line cables.

• **RF Shielding** is 50 dB greater than typical single shielded coax (40 dB). The multi-ply bonded foil outer conductor is rated conservatively at > 90 dB (i.e. >180 dB between two adjacent cables).

• **Weatherability:** LMR-195-LLPL cables are designed for indoor Plenum applications. Black jacketed LMR-LLPL versions can be supplied for applications that originate outdoors (e.g., rooftop) and subsequently enter the building.

• **Connectors:** A variety of connectors are available for LMR-195-LLPL cable, including the most common interface types. Most employ crimp outer attachment using standard hex crimp sizes.

• **Cable Assemblies:** All LMR-195-LLPL cable types are available as pre-terminated cable assemblies. Refer to the section on FlexTech for further details.



Construction Specifications			
Description	Material	In.	(mm)
Inner Conductor	Solid BC	0.037	(0.94)
Dielectric	Low density PTFE	0.113	(2.87)
Outer Conductor	Aluminum Tape	0.119	(3.02)
Overall Braid	Tinned Copper	0.142	(3.61)
Jacket	Orange FRPVC	0.195	(4.95)

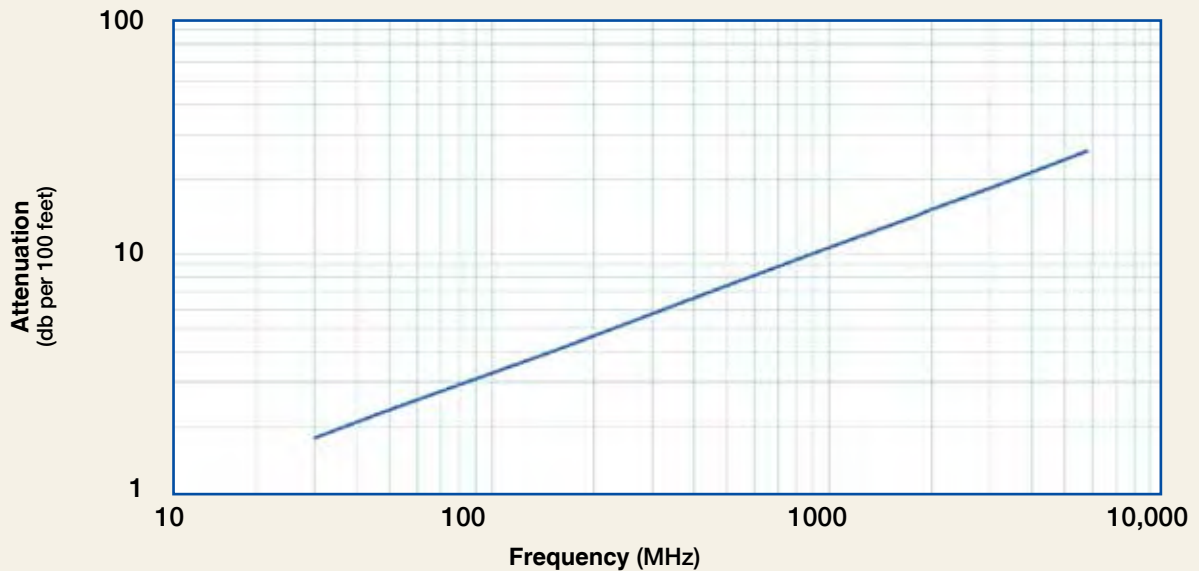
Mechanical Specifications			
Performance Property	Units	US	(metric)
Bend Radius: installation	in. (mm)	0.5	(12.7)
Bend Radius: repeated	in. (mm)	2.0	(50.8)
Bending Moment	ft-lb (N-m)	0.1	(0.14)
Weight	lb/ft (kg/m)	0.021	(0.03)
Tensile Strength	lb (kg)	40	(18.2)
Flat Plate Crush	lb/in. (kg/mm)	10	(0.18)

Environmental Specifications			
Performance Property		°F	°C
Installation Temperature Range		+23/+167	-5/+75
Storage Temperature Range		+23/+167	-5/+75
Operating Temperature Range		+23/+167	-5/+75

Electrical Specifications			
Performance Property	Units	US	(metric)
Velocity of Propagation	%	76	
Dielectric Constant	NA	1.73	
Time Delay	nS/ft (nS/m)	1.34	(4.40)
Impedance	ohms	50	
Capacitance	pF/ft (pF/m)	26.7	(87.6)
Inductance	uH/ft (uH/m)	0.067	(0.22)
Shielding Effectiveness	dB	>90	
DC Resistance			
Inner Conductor	ohms/1000ft (/km)	7.6	(24.9)
Outer Conductor	ohms/1000ft (/km)	4.9	(16.1)
Voltage Withstand	Volts DC	1000	
Jacket Spark	Volts RMS	3000	
Peak Power	kW	2.5	

Part Description				
Part No.	Application	Jacket	Color	Stock Code
LMRR-195-LLPL	Indoor/Outdoor Plenum CMP/FT-6	FRPVC	Orange	54211

Attenuation vs. Frequency (typical)



Frequency (MHz)	30	50	150	220	450	900	1500	1800	2000	2500	3400	5800
Attenuation dB/100 ft	2.0	2.5	4.4	5.3	7.8	10.9	14.1	15.4	16.3	18.3	21.4	28.2
Attenuation dB/100 m	6.4	8.3	14.4	17.5	25.1	35.6	46.2	50.7	53.5	60.0	70.2	92.5
Avg. Power kW	0.70	0.54	0.31	0.26	0.18	0.12	0.10	0.09	0.08	0.07	0.06	0.05

Calculate Attenuation =
 $(0.356297) \cdot \sqrt{\text{FMHz}} + (0.000183) \cdot \text{FMHz}$ (interactive calculator available at http://www.timesmicrowave.com/cable_calculators)
Attenuation:
 VSWR=1.0 ; Ambient = +25°C (77°F)
Power:
 VSWR=1.0; Ambient = +40°C; Jacket = +75°C (167°F); Sea Level; dry air; atmospheric pressure; no solar loading



Connectors												
Interface	Description	Part Number	Stock Code	VSWR** Freq. (GHz)	Coupling Nut	Inner Contact Attach	Outer Contact Attach	Finish* Body /Pin	Length in (mm)	Width in (mm)	Weight lb (g)	
1. N male	Straight Plug	TC-195-NM	3190-1555	<1.25:1 (2.5)	Knurl	Solder	Crimp	S/G	1.5 (38.1)	0.75 (19.1)	0.073 (33.1)	
2. SMA male	Straight Plug	TC-195-SM	3190-1553	<1.25:1 (2.5)	Hex	Solder	Crimp	SS/G	1.0 (25.4)	0.32 (8.1)	0.015 (6.8)	
3. TNC male	Straight Plug	TC-195-TM	3190-1554	<1.25:1 (2.5)	Knurl	Solder	Crimp	S/G	1.4 (35.6)	0.59 (15.0)	0.045 (20.4)	

* Finish metals: N=Nickel, S=Silver, G=Gold, SS=Stainless Steel, A=Alballoy **VSWR spec based on 3 foot cable with a connector pair



Install Tools

Type	Part Number	Stock Code	Description
Crimp Tool	CT-240/200/195/100	3190-667	Crimp tool for LMR-100, 195, 200 and 240 connectors
Deburr Tool	DBT-U	3192-001	Removes center conductor rough edges
Cutting Tool	CCT-01	3190-1544	Cable end flush cut tool
Replacement Blade	RB-01	3190-1609	Replacement blade for cutting tool
Strip Tool	CST-195/200	3192-102	Combination prep tool for LMR-195 & 200
Replacement Blade Kit	RB-CST	3192-086	Replacement blade kit for all strip tools



LMR[®]-200-LLPL Flexible Low Loss Plenum Coax

Ideal for...

- Indoor Plenum Feeder runs
- UL/NEC/CSA rated CMP/FT6
- Any wireless application (e.g. LMDS, MMDS, WLL, GPS, LMR, WLAN, WISP, WiMax, SCADA, Cellular, PCS, Paging) requiring an easily routed, low loss RF cable for in-building systems



• **LMR[®]-LLPL** is an indoor highly fire retarded cable intended specifically for runs within return air handling plenums (e.g. dropped ceilings, raised floors). It has a UL/NEC & CSA rating of ‘CMP’ and ‘FT6’ respectively.

• **Flexibility** and bendability are hallmarks of the LMR-200-LLPL cable design. The flexible outer conductor enables the tightest bend radius available for any cable of similar size and performance.

• **Low Loss** is another hallmark feature of LMR-200-LLPL. Size for size LMR has the lowest loss of any flexible cable and comparable loss to semirigid hard-line cables.

• **RF Shielding** is 50 dB greater than typical single shielded coax (40 dB). The multi-ply bonded foil outer conductor is rated conservatively at > 90 dB (i.e. >180 dB between two adjacent cables).

• **Weatherability:** LMR-200-LLPL cables are designed for indoor Plenum applications. Black jacketed LMR-LLPL versions can be supplied for applications that originate outdoors (e.g., rooftop) and subsequently enter the building.

• **Connectors:** A variety of connectors are available for LMR-200-LLPL cable, including the most common interface types. Most employ crimp outer attachment using standard hex crimp sizes.

• **Cable Assemblies:** All LMR-200-LLPL cable types are available as pre-terminated cable assemblies. Refer to the section on FlexTech for further details.

Part Description				
Part No.	Application	Jacket Color		Stock Code
LMR-200-LLPL	Indoor/Outdoor Plenum CMP/FT6	FRPVC	Orange	54058

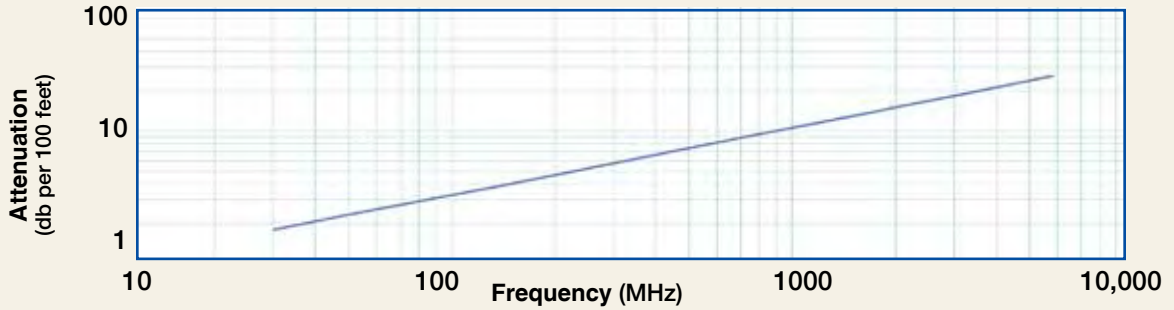
Construction Specifications			
Description	Material	In.	(mm)
Inner Conductor	Solid Bare Copper	0.040	(1.02)
Dielectric	Low density PTFE	0.118	(3.00)
Outer Conductor	Aluminum Tape	0.123	(3.12)
Overall Braid	Tinned Copper	0.146	(3.71)
Jacket	Orange FRPVC	0.195	(4.95)

Mechanical Specifications			
Performance Property	Units	US	(metric)
Bend Radius: installation	in. (mm)	0.5	(12.7)
Bend Radius: repeated	in. (mm)	2.0	(50.8)
Bending Moment	ft-lb (N-m)	0.2	(0.27)
Weight	lb/ft (kg/m)	0.032	(0.05)
Tensile Strength	lb (kg)	30	(13.6)
Flat Plate Crush	lb/in. (kg/mm)	65	(1.16)

Environmental Specifications			
Performance Property	°F		°C
Installation Temperature Range	+23/+167		-5/+75
Storage Temperature Range	+23/+167		-5/+75
Operating Temperature Range	+23/+167		-5/+75

Electrical Specifications			
Performance Property	Units	US	(metric)
Velocity of Propagation	%	76	
Dielectric Constant	NA	1.73	
Time Delay	nS/ft (nS/m)	1.34	(4.40)
Impedance	ohms	50	
Capacitance	pF/ft (pF/m)	26.7	(87.6)
Inductance	uH/ft (uH/m)	0.067	(0.22)
Shielding Effectiveness	dB	>90	
DC Resistance			
Inner Conductor	ohms/1000ft (/km)	6.5	(21.3)
Outer Conductor	ohms/1000ft (/km)	4.9	(16.1)
Voltage Withstand	Volts DC	1000	
Jacket Spark	Volts RMS	3000	
Peak Power	kW	2.5	

Attenuation vs. Frequency (typical)



Frequency (MHz)	30	50	150	220	450	900	1500	1800	2000	2500	3400	5800
Attenuation dB/100 ft	1.8	2.3	4.1	4.9	7.1	10.0	13.0	14.3	15.1	16.0	19.8	26.1
Attenuation dB/100 m	5.9	7.7	13.3	16.1	23.2	32.9	42.7	48.9	49.5	55.5	65.0	85.7
Avg. Power kW	0.77	0.59	0.34	0.28	0.19	0.14	0.11	0.10	0.09	0.08	0.07	0.05

Calculate Attenuation = $(0.329080) \cdot \sqrt{\text{FMHz}} + (0.00018) \cdot \text{FMHz}$ (interactive calculator available at http://www.timesmicrowave.com/cable_calculators)
 VSWR = 1.0, Ambient = +40C; Jacket = +75C (167F); Sea Level; dry air; atmospheric pressure; no solar loading



Connectors

Interface	Description	Part Number	Stock Code	VSWR** Freq. (GHz)	Coupling Nut	Inner Contact Attach	Outer Contact Attach	Finish* Body /Pin	Length in (mm)	Width in (mm)	Weight lb (g)
1. BNC Male	Straight Plug	TC-200-BM	3190-225	<1.25:1 (2.5)	Knurl	Solder	Crimp	S/G	1.7 (43.2)	0.56 (14.2)	0.045 (20.4)
2. Mini-UHF	Straight Plug	TC-200-MUHF	3190-444	<1.25:1 (2.5)	Knurl	Solder	Crimp	NG	1.1 (27.9)	0.45 (11.4)	0.015 (6.8)
3. N Male	Straight Plug	TC-200-NM	3190-224	<1.25:1 (2.5)	Knurl	Solder	Crimp	S/G	1.5 (38.1)	0.75 (19.1)	0.073 (33.1)
4.	Reverse Polarity	TC-200-NM-RP	3190-959	<1.25:1 (2.5)	Knurl	Solder	Crimp	N/G	1.5 (38.0)	0.75 (19.1)	0.073 (33.1)
5. TNC Male	Straight Plug	TC-200-TMC	3190-240	<1.25:1 (2.5)	Knurl	Solder	Clamp	S/G	1.7 (43.2)	0.59 (15.0)	0.045 (20.4)
6. TNC Female	Straight Jack	TC-200-TF	3190-263	<1.25:1 (2.5)	NA	Solder	Crimp	N/G	1.3 (33.0)	0.57 (14.5)	0.033 (15.0)
7. SMA-Male	Straight plug	TC-200-SM	3190-612	<1.25:1 (8)	Hex	Solder	Crimp	SS/G	1.0 (25.4)	0.32 (8.1)	0.015 (6.8)
8. SMA-Rev.Polarity	Straight Plug	TC-200-SM-RP	3190-327	<1.25:1 (2.5)	Hex	Solder	Crimp	SS/G	1.0 (25.4)	0.32 (8.1)	0.015 (6.8)

* Finish metals: N=Nickel, S=Silver, G=Gold, SS=Stainless Steel, A=Alballoy **VSWR spec based on 3 foot cable with a connector pair

Hardware Accessories



Type	Part Number	Stock Code	Description
Ground Kit	GK-S200TT	GK-S200TT	Standard Ground Kit (each)



CT-240/200/195/100 - 3190-667

Install Tools



CST-195/200
3192-102



RB-CST
3192-086

Type	Part Number	Stock Code	Description
Crimp Tool	CT-240/200/195/100	3190-667	Crimp tool for LMR-100, 195, 200 and 240 connectors
Deburr Tool	DBT-U	3192-001	Removes center conductor rough edges
Cutting Tool	CCT-01	3190-1544	Cable end flush cut tool
Strip Tool	CST-195/200	3192-102	Combination prep tool for LMR-195/200
Replacement Blade	RB-01	3190-1609	Replacement blade for cutting tool
Replacement Blade Kit	RB-CST	3192-086	Replacement Kit for all CST strip tools



DBT-U
3192-001



CCT-01
3190-1544

LMR[®]-240-LLPL Flexible Low Loss Plenum Coax

Ideal for...

- Indoor Plenum Feeder runs
- UL/NEC/CSA rated CMP/FT6
- Any wireless application (e.g. LMDS, MMDS, WLL, GPS, LMR, WLAN, WISP, WiMax, SCADA, Cellular, PCS, Paging) requiring an easily routed, low loss RF cable for in-building systems



• **LMR[®]-LLPL** is an indoor highly fire retarded cable intended specifically for runs within return air handling plenums (e.g. dropped ceilings, raised floors). It has a UL/NEC & CSA rating of ‘CMP’ and ‘FT6’ respectively.

• **Flexibility** and bendability are hallmarks of the LMR-240-LLPL cable design. The flexible outer conductor enables the tightest bend radius available for any cable of similar size and performance.

• **Low Loss** is another hallmark feature of LMR-240-LLPL. Size for size LMR has the lowest loss of any flexible cable and comparable loss to semirigid hard-line cables.

• **RF Shielding** is 50 dB greater than typical single shielded coax (40 dB). The multi-ply bonded foil outer conductor is rated conservatively at > 90 dB (i.e. >180 dB between two adjacent cables).

• **Weatherability:** LMR-240-LLPL cables are designed for indoor Plenum applications. Black jacketed LMR-LLPL versions can be supplied for applications that originate outdoors (e.g., rooftop) and subsequently enter the building.

• **Connectors:** A variety of connectors are available for LMR-240-LLPL cable, including the most common interface types. Most employ crimp outer attachment using standard hex crimp sizes.

• **Cable Assemblies:** All LMR-240-LLPL cable types are available as pre-terminated cable assemblies. Refer to the section on FlexTech for further details.

Part Description				
Part No.	Application	Jacket	Color	Stock Code
LMR-240-LLPL	Indoor/Outdoor Plenum CMP/FT6	FRPVC	Orange	54059

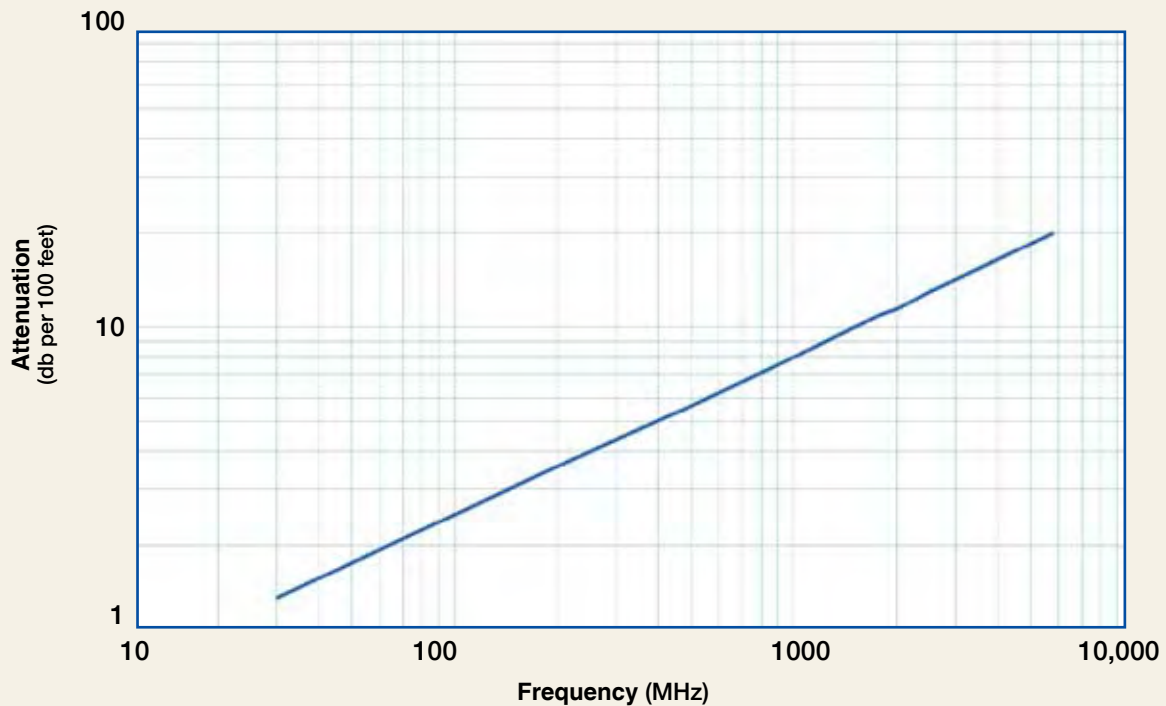
Construction Specifications			
Description	Material	In.	(mm)
Inner Conductor	Solid Bare Copper	0.051	(1.30)
Dielectric	Low density PTFE	0.150	(3.81)
Outer Conductor	Aluminum Tape	0.155	(3.94)
Overall Braid	Tinned Copper	0.178	(4.52)
Jacket	Orange FRPVC	0.240	(6.10)

Mechanical Specifications			
Performance Property	Units	US	(metric)
Bend Radius: installation	in. (mm)	0.75	(19.1)
Bend Radius: repeated	in. (mm)	2.5	(63.5)
Bending Moment	ft-lb (N-m)	0.25	(0.34)
Weight	lb/ft (kg/m)	0.047	(0.07)
Tensile Strength	lb (kg)	60	(27.22)
Flat Plate Crush	lb/in. (kg/mm)	85	(1.52)

Environmental Specifications		
Performance Property	°F	°C
Installation Temperature Range	+23/+167	-5/+75
Storage Temperature Range	+23/+167	-5/+75
Operating Temperature Range	+23/+167	-5/+75

Electrical Specifications			
Performance Property	Units	US	(metric)
Velocity of Propagation	%	76	
Dielectric Constant	NA	1.73	
Time Delay	nS/ft (nS/m)	1.34	(4.40)
Impedance	ohms	50	
Capacitance	pF/ft (pF/m)	26.7	(87.6)
Inductance	uH/ft (uH/m)	0.067	(0.22)
Shielding Effectiveness	dB	>90	
DC Resistance			
Inner Conductor	ohms/1000ft (/km)	4.0	(13.1)
Outer Conductor	ohms/1000ft (/km)	3.9	(12.8)
Voltage Withstand	Volts DC	1500	
Jacket Spark	Volts RMS	5000	
Peak Power	kW	5.6	

Attenuation vs. Frequency (typical)



Frequency (MHz)	30	50	150	220	450	900	1500	1800	2000	2500	3400	5800
Attenuation dB/100 ft	1.4	1.8	3.1	3.7	5.4	7.6	9.9	10.9	11.5	12.9	15.1	20.0
Attenuation dB/100 m	4.5	5.8	10.1	12.2	17.6	25.0	32.5	35.7	37.7	42.3	49.6	65.6
Avg. Power kW	1.18	0.91	0.52	0.43	0.30	0.21	0.16	0.15	0.14	0.12	0.10	0.08

Calculate Attenuation =
 $(0.248520) \cdot \sqrt{FMHz} + (0.000183) \cdot FMHz$ (interactive calculator available at http://www.timesmicrowave.com/cable_calculators)
Attenuation:
 VSWR=1.0; Ambient = +25°C (77°F)
Power:
 VSWR=1.0; Ambient = +40°C; Jacket = +75°C (167°F); Sea Level; dry air; atmospheric pressure; no solar loading

LMR[®]-240-LLPL Flexible Low Loss Plenum Coax



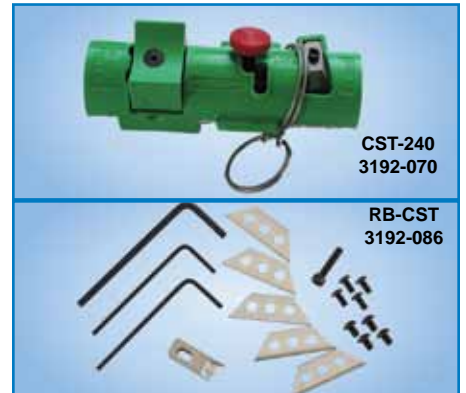
Connectors		Part Number	Stock Code	VSWR** Freq. (GHz)	Coupling Nut	Inner Contact Attach	Outer Contact Attach	Finish* Body /Pin	Length in (mm)	Width in (mm)	Weight lb (g)
1. BNC Male	Straight Plug	TC-240-BMC	3190-242	<1.25:1 (2.5)	Knurl	Solder	Clamp	S/G	1.7 (43)	0.56 (14.2)	0.040 (18.1)
2. Mini-UHF	Straight Plug	TC-240-MUHF	3190-445	<1.25:1 (2.5)	Knurl	Solder	Crimp	N/G	1.1 (28)	0.45 (11.4)	0.014 (6.4)
3. N Female	Bulkhead Jack	TC-240-NF-BH	3190-419	<1.25 (2.5)	NA	Solder	Crimp	A/G	1.7 (44)	0.88 (22.2)	0.115 (52.2)
4. N Male	Straight Plug	TC-240-NM	3190-382	<1.25:1 (2.5)	Hex	Solder	Crimp	N/S	1.5 (38)	0.75 (19.1)	0.086 (39.0)
5.	Straight Plug	TC-240-NMC	3190-244	<1.25:1 (2.5)	Knurl	Solder	Clamp	S/G	1.5 (38)	0.75 (19.1)	0.082 (37.2)
6. SMA Female	Bulkhead Jack	TC-240-SF-BH	3190-824	<1.25:1 (2.5)	NA	Solder	Crimp	SS/G	1.1 (29)	0.31 (7.9)	0.019 (8.6)
7. SMA Male	Straight Plug	TC-240-SM	3190-380	<1.25:1 (10)	Hex	Solder	Crimp	SS/G	1.0 (25)	0.32 (8.1)	0.016 (7.3)
8.	Right Angle	TC-240-SM-RA	3190-381	<1.35:1 (6)	Hex	Solder	Crimp	SS/G	0.8 (20)	0.65 (16.5)	0.019 (8.6)
9.	Rev. Polarity	TC-240-SM-RP	3190-326	<1.25:1 (2.5)	Hex	Solder	Crimp	SS/G	1.0 (25)	0.32 (8.1)	0.016 (7.3)
10. TNC Male	Straight Plug	TC-240-TM	3190-275	<1.25:1 (2.5)	Knurl	Solder	Crimp	N/S	1.7 (43)	0.59 (15.0)	0.043 (19.5)
11. N Male	Right Angle	TC-240-NMH-RA-D	3190-2426	<1.35:1 (6)	Hex/Knurl	Solder	Crimp	A/G	1.2 (32.4)	1.22 (31.0)	0.091 (41.7)

* Finish metals: N=Nickel, S=Silver, G=Gold, SS=Stainless Steel, A=Alb alloy **VSWR spec based on 3 foot cable with a connector pair



Hardware Accessories

Type	Part Number	Stock Code	Description
Ground Kit	GK-S240TT	GK-S240TT	Standard Ground Kit (each)



Install Tools

Type	Part Number	Stock Code	Description
Crimp Tool	CT-240/200/195/100	3190-667	Crimp tool for LMR-100, 195, 200 and 240 connectors
Strip Tool	CST-240	3192-070	Prep tool for LMR-240 connectors
Debrurr Tool	DBT-U	3192-001	Removes center conductor rough edges
Cutting Tool	CCT-01	3190-1544	Cable end flush cut tool
Replacement Blade	RB-01	3190-1609	Replacement blade for cutting tool
Replacement Blade Kit	RB-CST	3192-086	Replacement kit for all CST strip tools

LMR[®]-300-LLPL Flexible Low Loss Plenum Coax

Ideal for...

- Indoor Plenum Feeder runs
- UL/NEC/CSA rated CMP/FT6
- Any wireless application (e.g. LMDS, MMDS, WLL, GPS, LMR, WLAN, WISP, WiMax, SCADA, Cellular, PCS, Paging) requiring an easily routed, low loss RF cable for in-building systems



• **LMR[®]-LLPL** is an indoor highly fire retarded cable intended specifically for runs within return air handling plenums (e.g. dropped ceilings, raised floors). It has a UL/NEC & CSA rating of ‘CMP’ and ‘FT6’ respectively.

• **Flexibility** and bendability are hallmarks of the LMR-300-LLPL cable design. The flexible outer conductor enables the tightest bend radius available for any cable of similar size and performance.

• **Low Loss** is another hallmark feature of LMR-300-LLPL. Size for size LMR has the lowest loss of any flexible cable and comparable loss to semirigid hard-line cables.

• **RF Shielding** is 50 dB greater than typical single shielded coax (40 dB). The multi-ply bonded foil outer conductor is rated conservatively at > 90 dB (i.e. >180 dB between two adjacent cables).

• **Weatherability:** LMR-300-LLPL cables are designed for indoor Plenum applications. Black jacketed LMR-LLPL versions can be supplied for applications that originate outdoors (e.g., rooftop) and subsequently enter the building.

• **Connectors:** A variety of connectors are available for LMR-300-LLPL cable, including the most common interface types. Most employ crimp outer attachment using standard hex crimp sizes.

• **Cable Assemblies:** All LMR-300-LLPL cable types are available as pre-terminated cable assemblies. Refer to the section on FlexTech for further details.

Part Description			
Part Number	Application	Jacket Color	Stock Code
LMR-300-LLPL	Indoor/Outdoor Plenum CMP/FT6	FRPVC Orange	54175

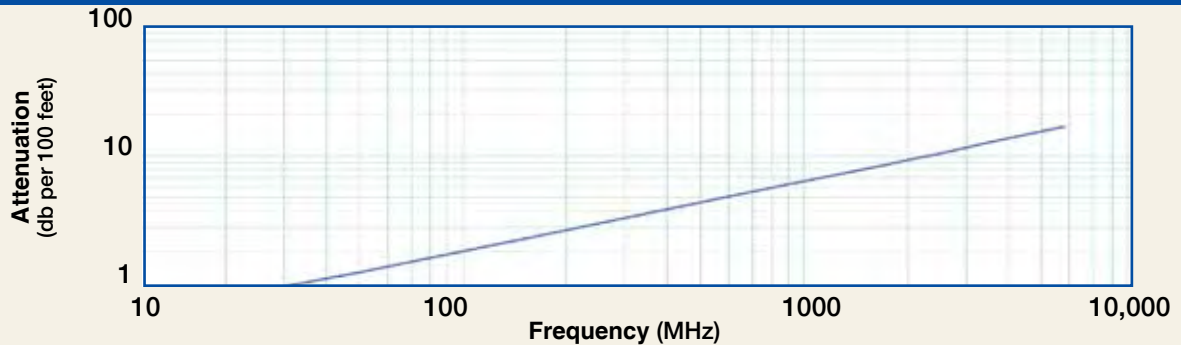
Construction Specifications			
Description	Material	In.	(mm)
Inner Conductor	Solid Bare Copper	0.063	(1.60)
Dielectric	Low density PTFE	0.190	(4.83)
Outer Conductor	Aluminum Tape	0.196	(4.98)
Overall Braid	Tinned Copper	0.225	(5.72)
Jacket	Orange FRPVC	0.300	(7.62)

Mechanical Specifications			
Performance Property	Units	US	(metric)
Bend Radius: installation	in. (mm)	0.88	(22.2)
Bend Radius: repeated	in. (mm)	3.0	(76.2)
Bending Moment	ft-lb (N-m)	0.38	(0.52)
Weight	lb/ft (kg/m)	0.055	(0.08)
Tensile Strength	lb (kg)	120	(54.5)
Flat Plate Crush	lb/in. (kg/mm)	30	(0.54)

Environmental Specifications			
Performance Property	°F	°C	
Installation Temperature Range	+23/+167	-5/+75	
Storage Temperature Range	+23/+167	-5/+75	
Operating Temperature Range	+23/+167	-5/+75	

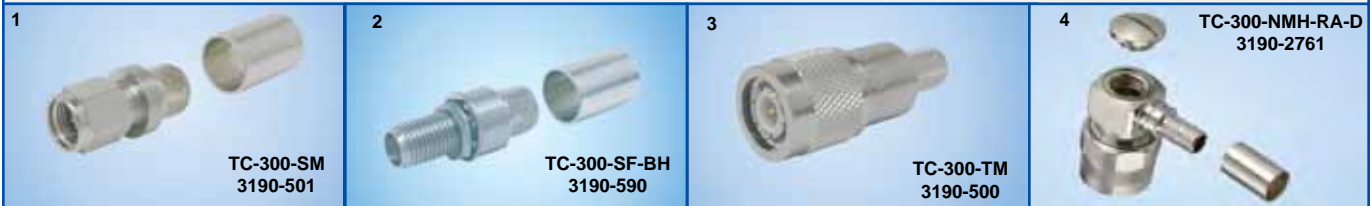
Electrical Specifications			
Performance Property	Units	US	(metric)
Velocity of Propagation	%	76	
Dielectric Constant	NA	1.73	
Time Delay	nS/ft (nS/m)	1.34	(4.40)
Impedance	ohms	50	
Capacitance	pF/ft (pF/m)	26.7	(87.6)
Inductance	uH/ft (uH/m)	0.067	(0.22)
Shielding Effectiveness	dB	>90	
DC Resistance			
Inner Conductor	ohms/1000ft (/km)	2.61	(8.6)
Outer Conductor	ohms/1000ft (/km)	2.21	(7.3)
Voltage Withstand	Volts DC	2000	
Jacket Spark	Volts RMS	5000	
Peak Power	kW	10	

Attenuation vs. Frequency (typical)



Frequency (MHz)	30	50	150	220	450	900	1500	1800	2000	2500	3400	5800
Attenuation dB/100 ft	1.1	1.4	2.5	3.0	4.3	6.2	8.1	8.9	9.4	10.5	12.3	16.4
Attenuation dB/100 m	3.6	4.7	8.2	9.9	14.3	20.3	26.4	29.1	30.7	34.5	40.5	53.7
Avg. Power kW	1.72	1.33	0.77	0.63	0.44	0.31	0.24	0.21	0.20	0.18	0.15	0.11

Calculate Attenuation = $(0.200950) \cdot \sqrt{\text{FMHz}} + (0.000183) \cdot \text{FMHz}$ (interactive calculator available at http://www.timesmicrowave.com/cable_calculators)
 Attenuation: VSWR=1.0; Ambient = +25°C (77°F) Power: VSWR=1.0; Ambient = +40°C; Jacket = +75°C (167°F);
 Sea Level; dry air; atmospheric pressure; no solar loading



Connectors

Interface	Description	Part Number	Stock Code	VSWR Freq.	Coupling (GHz)	Inner Contact Attach	Outer Contact Attach	Finish* /Pin	Length in	Width in	Weight lb
1. SMA Male	Straight Plug	TC-300-SM	3190-501	<1.25:1	(2.5)	Hex	Solder	Crimp SS/G	1.0 (25)	0.35 (8.9)	0.018 (8.2)
2. SMA Female	Bulkhead Jack	TC-300-SF-BH	3190-590	<1.25:1	(2.5)	NA	Solder	Crimp SS/G	1.1 (28)	0.31 (7.9)	0.022 (10.0)
3. TNC Male	Straight Plug	TC-300-TM	3190-500	<1.25:1	(2.5)	Knurl	Solder	Crimp N/S	1.7 (43)	0.59 (15.0)	0.050 (22.7)
4. N Male	Right Angle	TC-300-NMH-RA-D	3190-2761	<1.30:1	(2.5)	Hex/Knurl	Solder	Crimp N/S	1.4 (35)	1.41 (35.8)	0.130 (59.0)

* Finish metals: N=Nickel, S=Silver, G=Gold, SS=Stainless Steel, A=Albally **VSWR spec based on 3 foot cable with a connector pair

Hardware Accessories



Type	Part Number	Stock Code	Description
Ground Kit	GK-S300TT	GK-S300TT	Standard Ground Kit (each)



Install Tools

Type	Part Number	Stock Code	Description
Crimp Tool	CT-400/300	3190-666	Crimp tool for LMR 300 connectors
Deburr Tool	DBT-U	3192-001	Removes center conductor rough edges
Cutting Tool	CCT-01	3190-1544	Cable end flush cut tool
Cutting Tool	CST-300	3192-084	Combination prep tool for LMR-300
Replacement Blade	RB-01	3190-1609	Replacement blade for cutting tool
Replacement Blade Kit	RB-CST	3192-086	Replacement blade kit for all strip tools



LMR®-400-LLPL Flexible Low Loss Plenum Coax

Ideal for...

- Indoor Plenum Feeder runs
- UL/NEC/CSA rated CMP/FT6
- Any wireless application (e.g. LMDS, MMDS, WLL, GPS, LMR, WLAN, WISP, WiMax, SCADA, Cellular, PCS, Paging) requiring an easily routed, low loss RF cable for in-building systems



• **LMR®-LLPL** is an indoor highly fire retarded cable intended specifically for runs within return air handling plenums (e.g. dropped ceilings, raised floors). It has a UL/NEC & CSA rating of ‘CMP’ and ‘FT6’ respectively.

• **Flexibility** and bendability are hallmarks of the LMR-400-LLPL cable design. The flexible outer conductor enables the tightest bend radius available for any cable of similar size and performance.

• **Low Loss** is another hallmark feature of LMR-400-LLPL. Size for size LMR has the lowest loss of any flexible cable and comparable loss to semirigid hard-line cables.

• **RF Shielding** is 50 dB greater than typical single shielded coax (40 dB). The multi-ply bonded foil outer conductor is rated conservatively at > 90 dB (i.e. >180 dB between two adjacent cables).

• **Weatherability:** LMR-400-LLPL cables are designed for indoor Plenum applications. Black jacketed LMR-LLPL versions can be supplied for applications that originate outdoors (e.g., rooftop) and subsequently enter the building.

• **Connectors:** A variety of connectors are available for LMR-400-LLPL cable, including the most common interface types. Most employ crimp outer attachment using standard hex crimp sizes.

• **Cable Assemblies:** All LMR-400-LLPL cable types are available as pre-terminated cable assemblies. Refer to the section on FlexTech for further details.

Part Description

Part Number	Application	Jacket	Color	Stock Code
LMR-400-LLPL	Indoor/Outdoor Plenum CMP/FT6	FRPVC	Orange	54070

Construction Specifications

Description	Material	In.	(mm)
Inner Conductor	Solid BCCAI	0.095	(2.41)
Dielectric	Low density PTFE	0.285	(7.24)
Outer Conductor	Aluminum Tape	0.291	(7.39)
Overall Braid	Tinned Copper	0.320	(8.13)
Jacket	Orange FRPVC	0.405	(10.29)

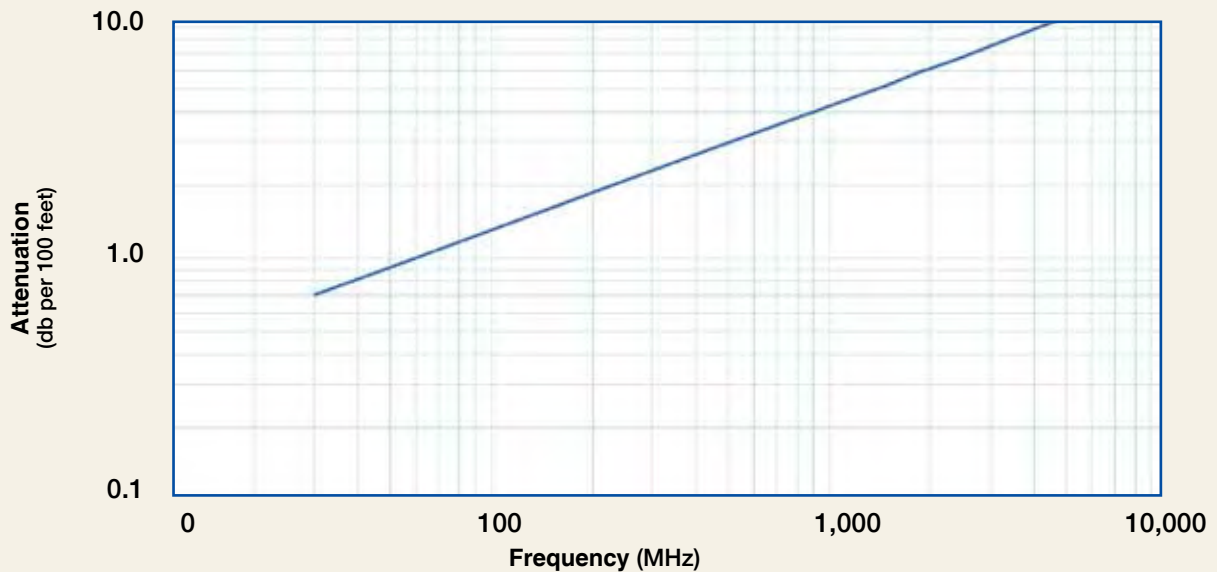
TIMES MICROWAVE

Mechanical Specifications			
Performance Property	Units	US	(metric)
Bend Radius: installation	in. (mm)	1.00	(25.4)
Bend Radius: repeated	in. (mm)	4.0	(101.6)
Bending Moment	ft-lb (N-m)	0.5	(0.68)
Weight	lb/ft (kg/m)	0.114	(0.17)
Tensile Strength	lb (kg)	120	(54.5)
Flat Plate Crush	lb/in. (kg/mm)	185	(3.31)

Environmental Specifications		
Performance Property	°F	°C
Installation Temperature Range	+23/+167	-5/+75
Storage Temperature Range	+23/+167	-5/+75
Operating Temperature Range	+23/+167	-5/+75

Electrical Specifications			
Performance Property	Units	US	(metric)
Velocity of Propagation	%	76	
Dielectric Constant	NA	1.73	
Time Delay	nS/ft (nS/m)	1.34	(4.40)
Impedance	ohms	50	
Capacitance	pF/ft (pF/m)	26.7	(87.6)
Inductance	uH/ft (uH/m)	0.067	(0.22)
Shielding Effectiveness	dB	>90	
DC Resistance			
Inner Conductor	ohms/1000ft (/km)	1.8	(5.9)
Outer Conductor	ohms/1000ft (/km)	1.65	(5.4)
Voltage Withstand	Volts DC	2500	
Jacket Spark	Volts RMS	8000	
Peak Power	kW	16	

Attenuation vs. Frequency (typical)



Frequency (MHz)	30	50	150	220	450	900	1500	1800	2000	2500	3400	5800
Attenuation dB/100 ft	0.7	0.9	1.6	1.9	2.8	4.0	5.2	5.7	6.1	6.8	8.0	10.7
Attenuation dB/100 m	2.3	3.0	5.3	6.4	9.2	13.2	17.1	18.9	19.9	22.4	26.4	35.1
Avg. Power kW	3.33	2.57	1.48	1.22	0.84	0.59	0.45	0.41	0.39	0.34	0.29	0.22

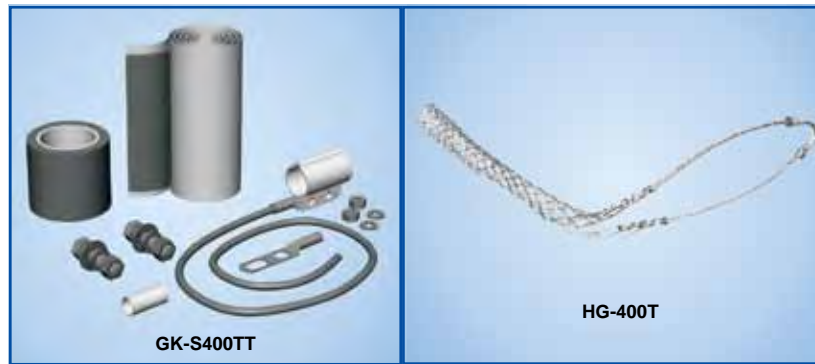
Calculate Attenuation =
 $(0.129140) \cdot \sqrt{\text{FMHz}} + (0.000150) \cdot \text{FMHz}$ (interactive calculator available at http://www.timesmicrowave.com/cable_calculators)
Attenuation:
 VSWR=1.0 ; Ambient = +25°C (77°F)
Power:
 VSWR=1.0; Ambient = +40°C; Jacket = +75°C (167°F); Sea Level; dry air; atmospheric pressure; no solar loading

LMR[®]-400-LLPL Flexible Low Loss Plenum Coax



Connectors											
Interface	Description	Part Number	Stock Code	VSWR** Freq. (GHz)	Coupling Nut	Inner Contact Attach	Outer Contact Attach	Finish* Body /Pin	Length in (mm)	Width in (mm)	Weight lb (g)
1. N Female	Straight Jack	TC-400-NF-PL	3190-964	<1.25:1 (2.5)	NA	Solder	Crimp	N/G	1.8 (45)	0.66 (16.8)	0.105 (47.6)
2. N Male	Straight Plug	EZ-400-NMH-PL-D	3190-602	<1.25:1 (2.5)	Hex/Knurl	Spring Finger	Crimp	A/G	1.5 (38)	0.89 (22.6)	0.113 (51.3)
3.	Straight Plug	TC-400-NMH-PL	3190-759	<1.25:1 (2.5)	Hex	Solder	Crimp	S/G	1.5 (38)	0.89 (22.6)	0.113 (51.3)
4. TNC	Right Angle	TC-400-TM-RA-D	3190-2671	<1.35:1 (6)	Hex/Knurl	Solder	Crimp	A/G	1.2 (30)	1.48 (37.6)	0.110 (50.0)

* Finish metals: N=Nickel, S=Silver, G=Gold, SS=Stainless Steel, A=Alballoy **VSWR spec based on 3 foot cable with a connector pair



Hardware Accessories

Type	Part Number	Stock Code	Description
Ground Kit	GK-S400TT	GK-S400TT	Standard Grounding Kit (each)
Hoisting Grip	HG-400T	HG-400T	Laced Type (each)



Install Tools

Type	Part Number	Stock Code	Description
Crimp Tool	HX-4	3190-200	Crimp Handle
Crimp Dies	Y1719	3190-202	.429" Hex Dies
Crimp Tool	CT-400/300	3190-666	Crimp tool for LMR 400 connectors
Crimp Rings	CR-400	3190-830	Crimp rings for TC/EZ-400 connectors (package of 10)
Strip Tool	CST-400	3192-004	Combination prep tool for LMR-400 crimp and clamp connectors
Mid-Span Strip Tool	GST-400	3190-2174	For ground strap attachment
Deburr Tool	DBT-U	3192-001	Removes center conductor rough edges
Cutting Tool	CCT-01	3190-1544	Cable end flush cut tool
Replacement Blade	RB-01	3190-1609	Replacement blade for cutting tool
Replacement Blade Kit	RB-CST	3192-086	Replacement kit for all CST strip tools
Tool Kit	TK-400EZ	3190-1602	Tool kit for LMR-400 crimp/clamp connectors (includes CCT-01, CST-400, CT-400/300, Tool Pouch)

LMR[®]-500-LLPL Flexible Low Loss Plenum Coax

Ideal for...

- Indoor Plenum Feeder runs
- UL/NEC/CSA rated CMP/FT6
- Any wireless application (e.g. LMDS, MMDS, WLL, GPS, LMR, WLAN, WISP, WiMax, SCADA, Cellular, PCS, Paging) requiring an easily routed, low loss RF cable for in-building systems

• **LMR[®]-LLPL** is an indoor highly fire retarded cable intended specifically for runs within return air handling plenums (e.g. dropped ceilings, raised floors). It has a UL/NEC & CSA rating of ‘CMP’ and ‘FT6’ respectively.

• **Flexibility** and bendability are hallmarks of the LMR-500-LLPL cable design. The flexible outer conductor enables the tightest bend radius available for any cable of similar size and performance.

• **Low Loss** is another hallmark feature of LMR-500-LLPL. Size for size LMR has the lowest loss of any flexible cable and comparable loss to semirigid hard-line cables.

• **RF Shielding** is 50 dB greater than typical single shielded coax (40 dB). The multi-ply bonded foil outer conductor is rated conservatively at > 90 dB (i.e. >180 dB between two adjacent cables).

• **Weatherability:** LMR-500-LLPL cables are designed for indoor Plenum applications. Black jacketed LMR-LLPL versions can be supplied for applications that originate outdoors (e.g., rooftop) and subsequently enter the building.

• **Connectors:** A variety of connectors are available for LMR-500-LLPL cable, including the most common interface types. Most employ crimp outer attachment using standard hex crimp sizes.

• **Cable Assemblies:** All LMR-500-LLPL cable types are available as pre-terminated cable assemblies. Refer to the section on FlexTech for further details.



Construction Specifications			
Description	Material	In.	(mm)
Inner Conductor	Solid BCCAI	0.121	(3.07)
Dielectric	Low density PTFE	0.370	(9.40)
Outer Conductor	Aluminum Tape	0.376	(9.55)
Overall Braid	Tinned Copper	0.405	(10.29)
Jacket	Orange FRPVC	0.500	(12.70)

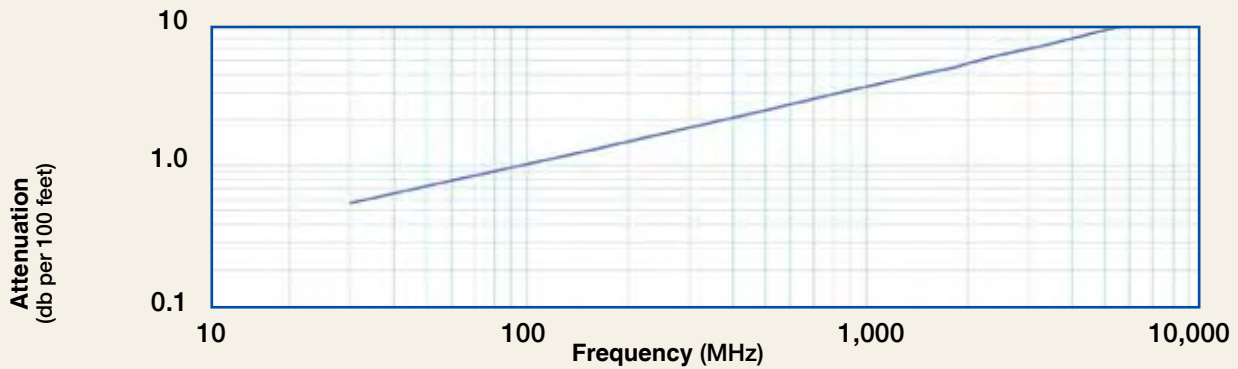
Mechanical Specifications			
Performance Property	Units	US	(metric)
Bend Radius: installation	in. (mm)	1.25	(31.8)
Bend Radius: repeated	in. (mm)	5.0	(127.0)
Bending Moment	ft-lb (N-m)	1.75	(2.37)
Weight	lb/ft (kg/m)	0.174	(0.26)
Tensile Strength	lb (kg)	195	(88.5)
Flat Plate Crush	lb/in. (kg/mm)	200	(3.57)

Environmental Specifications			
Performance Property		°F	°C
Installation Temperature Range		+23/+167	-5/+75
Storage Temperature Range		+23/+167	-5/+75
Operating Temperature Range		+23/+167	-5/+75

Electrical Specifications			
Performance Property	Units	US	(metric)
Velocity of Propagation	%	76	
Dielectric Constant	NA	1.73	
Time Delay	nS/ft (nS/m)	1.34	(4.40)
Impedance	ohms	50	
Capacitance	pF/ft (pF/m)	26.7	(87.6)
Inductance	uH/ft (uH/m)	0.067	(0.22)
Shielding Effectiveness	dB	>90	
DC Resistance			
Inner Conductor	ohms/1000ft (/km)	1.09	(3.6)
Outer Conductor	ohms/1000ft (/km)	1.27	(4.2)
Voltage Withstand	Volts DC	3000	
Jacket Spark	Volts RMS	8000	
Peak Power	kW	11.6	

Part Description				
Part Number	Application	Jacket	Color	Stock Code
LMR-500-LLPL	Indoor/Outdoor Plenum CMP/FT6	FRPVC	Orange	54060

Attenuation vs. Frequency (typical)



Frequency (MHz)	30	50	150	220	450	900	1500	1800	2000	2500	3400	5800
Attenuation dB/100 ft	0.6	0.7	1.3	1.5	2.2	3.1	4.1	4.5	4.8	5.4	6.4	8.5
Attenuation dB/100 m	1.8	2.4	4.1	5.0	7.2	10.3	13.5	14.8	15.7	17.7	20.9	27.9
Avg. Power kW	4.99	3.86	2.21	1.82	1.26	0.88	0.67	0.61	0.58	0.51	0.43	0.32

Calculate Attenuation = $(0.100260) \cdot \sqrt{\text{FMHz}} + (0.000150) \cdot \text{FMHz}$ (interactive calculator available at http://www.timesmicrowave.com/cable_calculators)
 Attenuation: VSWR=1.0 ; Ambient = +25°C (77°F) Power: VSWR=1.0; Ambient = +40°C; Jacket = +75°C (167°F);
 Sea Level; dry air; atmospheric pressure; no solar loading



Connectors

Interface	Description	Number	Part Code	Stock	VSWR**	Coupling Freq. (GHz)	Nut	Inner Contact Attach	Outer Contact Attach	Finish* Body /Pin	Length in (mm)	Width in (mm)	Weight lb (g)
1. N Male	Straight Plug	TC-500-NMH-X	3190-2514	<1.35:5	(6)	Hex/Knurl	Solder	Crimp	A/G	1.8 (45)	0.87 (22.0)	0.099 (45.0)	
2.	Right Angle	TC-500-NMH-RA-D	3190-2513	<1.25:1	(6)	Hex/Knurl	Solder	Crimp	A/G	1.5 (39)	1.6 (42.0)	0.279 (127.0)	
3.	Straight Plug	TC-500-NMC-PL	3190-900	<1.25:1	(2.5)	Hex	Solder	Clamp	S/G	2.1 (53)	0.92 (23.4)	0.228 (103.4)	

* Finish metals: N=Nickel, S=Silver, G=Gold, SS=Stainless Steel, A=Alballoy **VSWR spec based on 3 foot cable with a connector pair



Install Tools

Type	Part Number	Stock Code	Description
Crimp Tool	HX-4	3190-200	Crimp Handle
Crimp Dies	Y151	3190-465	.532" Hex Dies
Deburr Tool	DBT-U	3192-001	Removes center conductor rough edges
Cutting Tool	CCT-01	3190-1544	Cable end flush cut tool
Strip Tool	CST-500	3192-075	Combination prep tool for LMR-500
Replacement Blade Kit	RB-CST	3192-086	Replacement blade kit for all CST strip tools
Replacement Blade	RB-01	3190-1609	Replacement blade for cutting tool

LMR[®]-600-LLPL Flexible Low Loss Plenum Coax

Ideal for...

- Indoor Plenum Feeder runs
- UL/NEC/CSA rated CMP/FT6
- Any wireless application (e.g. LMDS, MMDS, WLL, GPS, LMR, WLAN, WISP, WiMax, SCADA, Cellular, PCS, Paging) requiring an easily routed, low loss RF cable for in-building systems



- **LMR[®]-LLPL** is an indoor highly fire retarded cable intended specifically for runs within return air handling plenums (e.g. dropped ceilings, raised floors). It has a UL/NEC & CSA rating of ‘CMP’ and ‘FT6’ respectively.

- **Flexibility** and bendability are hallmarks of the LMR-600-LLPL cable design. The flexible outer conductor enables the tightest bend radius available for any cable of similar size and performance.

- **Low Loss** is another hallmark feature of LMR-600-LLPL. Size for size LMR has the lowest loss of any flexible cable and comparable loss to semirigid hard-line cables.

- **RF Shielding** is 50 dB greater than typical single shielded coax (40 dB). The multi-ply bonded foil outer conductor is rated conservatively at > 90 dB (i.e. >180 dB between two adjacent cables).

- **Weatherability:** LMR-600-LLPL cables are designed for indoor Plenum applications. Black jacketed LMR-LLPL versions can be supplied for applications that originate outdoors (e.g., rooftop) and subsequently enter the building.

- **Connectors:** A variety of connectors are available for LMR-600-LLPL cable, including the most common interface types. Most employ crimp outer attachment using standard hex crimp sizes.

- **Cable Assemblies:** All LMR-600-LLPL cable types are available as pre-terminated cable assemblies. Refer to the section on FlexTech for further details.

Part Description

Part Number	Application	Jacket	Color	Stock Code
LMR-600-LLPL	Indoor/Outdoor CMP/FT6	Plenum FRPVC	Orange	54061

Construction Specifications

Description	Material	In.	(mm)
Inner Conductor	Solid BCCAI	0.150	(3.81)
Dielectric	Low density PTFE	0.455	(11.56)
Outer Conductor	Aluminum Tape	0.461	(11.71)
Overall Braid	Tinned Copper	0.490	(12.45)
Jacket	Orange FRPVC	0.590	(14.99)

Environmental Specifications

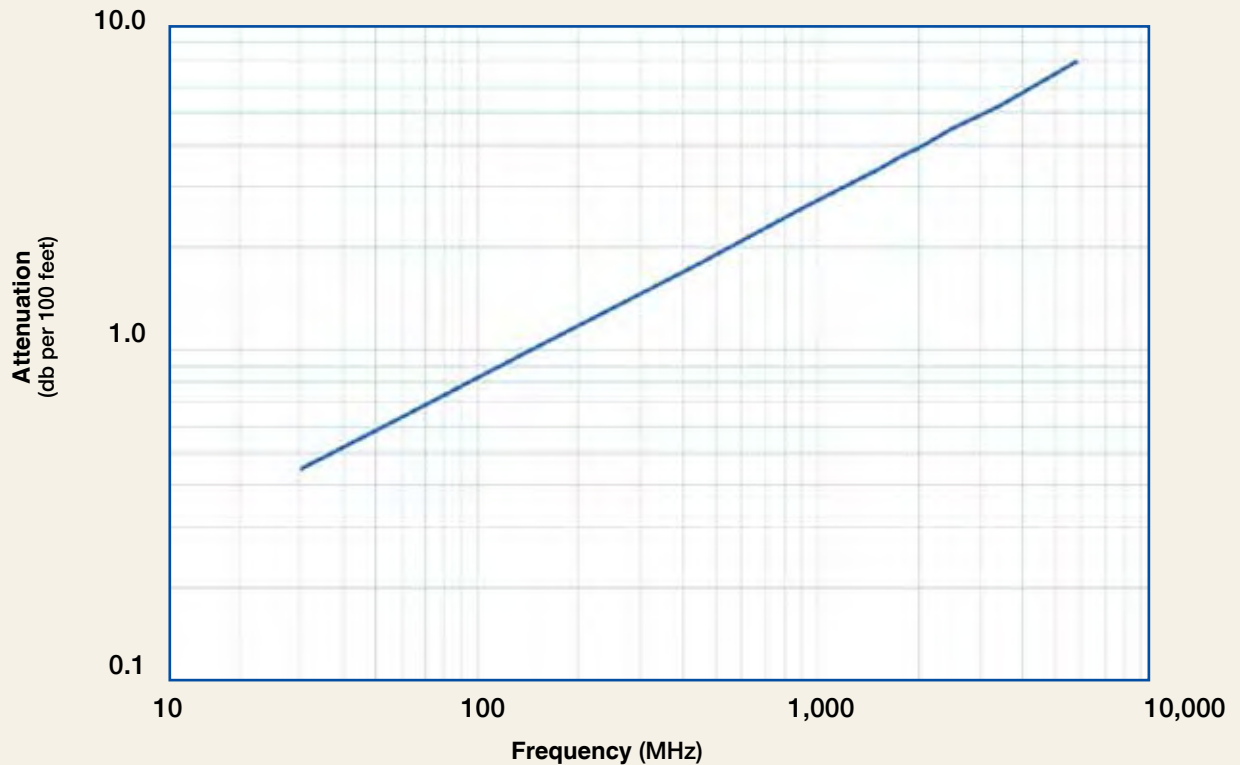
Performance Property	°F	°C
Installation Temperature Range	+23/+167	-5/+75
Storage Temperature Range	+23/+167	-5/+75
Operating Temperature Range	+23/+167	-5/+75

Electrical Specifications

Performance Property	Units	US	(metric)
Velocity of Propagation	%	76	
Dielectric Constant	NA	1.73	
Time Delay	nS/ft (nS/m)	1.34	(4.40)
Impedance	ohms	50	
Capacitance	pF/ft (pF/m)	26.7	(87.6)
Inductance	uH/ft (uH/m)	0.067	(0.22)
Shielding Effectiveness	dB	>90	
DC Resistance			
Inner Conductor	ohms/1000ft (/km)	0.73	(2.40)
Outer Conductor	ohms/1000ft (/km)	1.20	(3.9)
Voltage Withstand	Volts DC	4000	
Jacket Spark	Volts RMS	8000	
Peak Power	kW	40	

Mechanical Specifications			
Performance Property	Units	US	(metric)
Bend Radius: installation	in. (mm)	1.5	(38.1)
Bend Radius: repeated	in (mm)	6.0	(152.4)
Bending Moment	ft-lb (N-m)	2.75	(3.73)
Weight	lb/ft (kg/m)	0.24	(0.36)
Tensile Strength	lb (kg)	265	(120.3)
Flat Plate Crush	lb/in. (kg/mm)	210	(3.75)

Attenuation vs. Frequency (typical)



Frequency (MHz)	30	50	150	220	450	900	1500	1800	2000	2500	3400	5800
Attenuation dB/100 ft	0.5	0.6	1.0	1.2	1.8	2.6	3.4	3.7	3.9	4.4	5.3	7.1
Attenuation dB/100 m	1.5	1.9	3.3	4.1	5.9	8.5	11.1	12.2	12.9	14.5	17.2	23.2
Avg. Power kW	6.97	5.39	3.08	2.53	1.75	1.22	0.93	0.84	0.79	0.70	0.59	0.44

Calculate Attenuation =
 $(0.081390) \cdot \sqrt{\text{FMHz}} + (0.000150) \cdot \text{FMHz}$ (interactive calculator available at http://www.timesmicrowave.com/cable_calculators)
Attenuation:
 VSWR=1.0 ; Ambient = +25°C (77°F)
Power:
 VSWR=1.0; Ambient = +40°C; Jacket = +75°C (167°F); Sea Level; dry air; atmospheric pressure; no solar loading

LMR®-600-LLPL Flexible Low Loss Plenum Coax



Connectors													
Interface	Part Description	Stock Number	Code	VSWR**	Coupling Freq. (GHz)	Contact Nut	Contact Attach	Inner Body Attach	Outer /Pin	Finish* Length in (mm)	Width in (mm)	Weight lb	Weight (g)
1. LC Male	Straight plug	TC-600-LCM-PL	3190-1221	<1.25:1	(1)	Hex	Solder	Clamp	N/S	3.1 (78.7)	1.62 (41.1)	1.20	(544)
2. N Male	Straight Plug	EZ-600-NMH-PL-D	3190-603	<1.25:1	(2.5)	Hex/Knurl	Spring Finger	Crimp	A/G	2.1 (53)	0.92 (23.4)	0.166	(75.3)
3.	Straight Plug	TC-600-NMH-PL	3190-760	<1.25:1	(2.5)	Hex	Solder	Crimp	S/G	2.1 (53)	0.92 (23.4)	0.208	(93.4)
4.	Right Angle	TC-600-NMC-RA	3190-233	<1.35:1	(2.5)	Hex	Solder	Clamp	S/G	2.1 (53)	0.92 (23.4)	0.280	(17.9)

* Finish metals: N=Nickel, S=Silver, G=Gold, SS=Stainless Steel, A=Alballoy **VSWR spec based on 3 foot cable with a connector pair



Hardware Accessories

Type	Part Number	Stock Code	Description
Ground Kit	GK-S600TT	GK-S600TT	Standard Grounding Kit (each)
Hoisting Grip	HG-600T	HG-600T	Split/Laced Type (each)
Cold Shrink	CS-A600T	CS-A600T	Cable to Antenna Junction (each)
Cold Shrink	CS-60120T	CS-60120T	LMR-600 to -1200 Junction (each)
Cold Shrink	CS-60170T	CS-60170T	LMR-600 to -1700 Junction (each)
Hanger Blocks	CB-600T	CB-600T	Dual Cable Support Block (kit of 10)
Hanger Block Supporting Hardware			Complete Range of Supporting Hardware & Adapters Available
Snap-In Hangers	SH-U600T	SH-U600T	Snap-In Hangers (Kit of 10)



Install Tools

Type	Part Number	Stock Code	Description
Crimp Tool	HX-4	3190-200	Crimp Handle
Crimp Dies	Y1720	3190-203	.610" Hex Dies
Crimp Rings	CR-600	3190-831	Crimp Rings for TC/EZ-600 connectors (pkg of 10)
Deburr Tool	DBT-U	3192-001	Removes center conductor rough edges
Midspan Strip Tool	GST-600A	3190-1051	For ground strap attachment
Cutting Tool	CCT-01	3190-1544	Cable end flush cut tool
Replacement Blade	RB-01	3190-1609	Replacement blade for cutting tool
Replacemnt Blade Kit	RB-CST	3192-086	Replacement blade kit for all CST strip tools
Replacement Blades	RB-456	3190-421	Replacement blades for CST-600C and ST-600EZ
Prep Tool	CST-600	3192-052	Prep tool for LMR-600 crimp/clamp style connectors
Tool Kit	TK-600EZ	3190-1602	Tool kit for LMR-600 crimp/clamp connectors (includes CCT-01, CST-600, HX-4, Y1720, Tool Pouch)

LMR®-900-LLPL Flexible Low Loss Plenum Coax

Ideal for...

- Indoor Plenum Feeder runs
- UL/NEC/CSA rated CMP/FT6
- Any wireless application (e.g. LMDS, MMDS, WLL, GPS, LMR, WLAN, WISP, WiMax, SCADA, Cellular, PCS, Paging) requiring an easily routed, low loss RF cable for in-building systems



- **LMR®-LLPL** is an indoor highly fire retarded cable intended specifically for runs within return air handling plenums (e.g. dropped ceilings, raised floors). It has a UL/NEC & CSA rating of ‘CMP’ and ‘FT6’ respectively.
- **Flexibility** and bendability are hallmarks of the LMR-900-LLPL cable design. The flexible outer conductor enables the tightest bend radius available for any cable of similar size and performance.
- **Low Loss** is another hallmark feature of LMR-900-LLPL. Size for size LMR has the lowest loss of any flexible cable and comparable loss to semirigid hard-line cables.
- **RF Shielding** is 50 dB greater than typical single shielded coax (40 dB). The multi-ply bonded foil outer conductor is rated conservatively at > 90 dB (i.e. >180 dB between two adjacent cables).
- **Weatherability:** LMR-900-LLPL cables are designed for indoor Plenum applications. Black jacketed LMR-LLPL versions can be supplied for applications that originate outdoors (e.g., rooftop) and subsequently enter the building.

- **Connectors:** Type-N and 7-16 male and female connectors are available for LMR-900-LLPL cable. Other interface types can be provided by using a short jumper cable assembly.
- **Cable Assemblies:** All LMR-900-LLPL cable types are available as pre-terminated cable assemblies. Refer to the section on FlexTech for further details.

Part Description

Part Number	Application	Jacket	Color	Stock Code
LMR-900-LLPL	Indoor/Outdoor Plenum CMP/FT6	FRPVC	Orange	54062

Construction Specifications

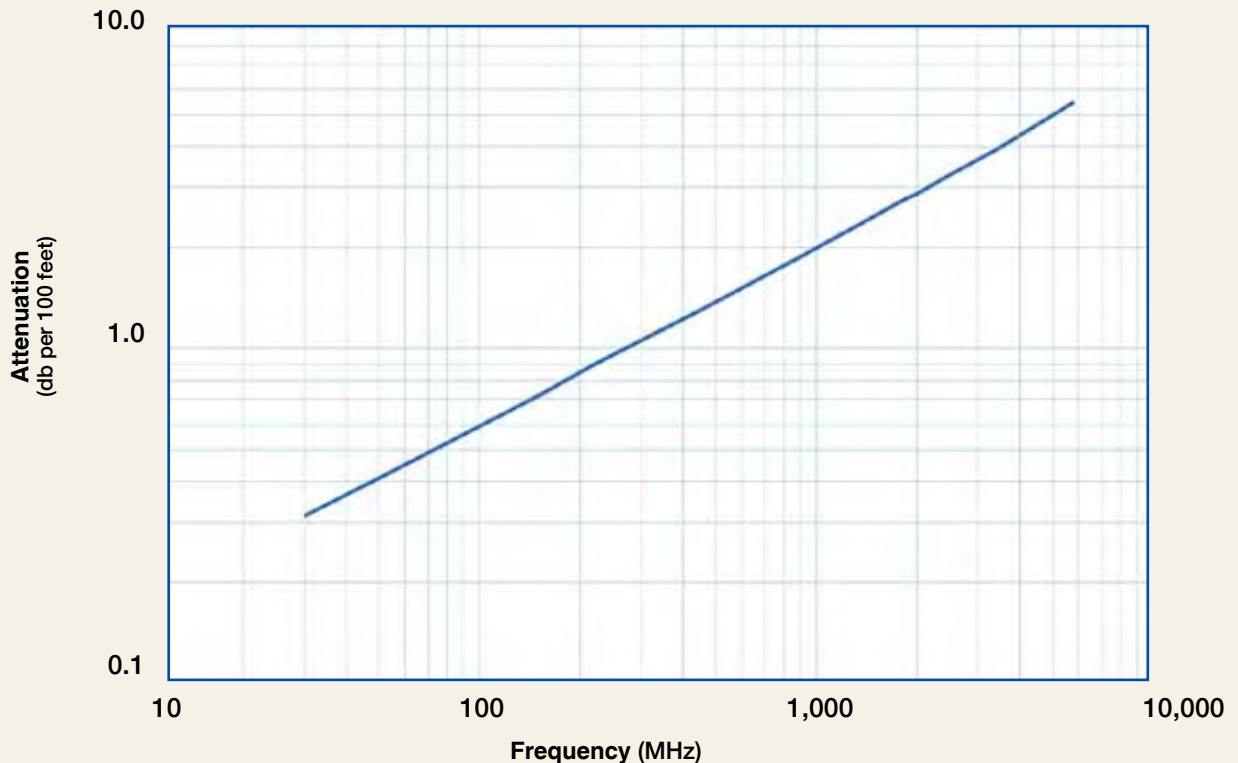
Description	Material	In.	(mm)
Inner Conductor	BC Tube	0.227	(5.77)
Dielectric	Low density PTFE	0.680	(17.27)
Outer Conductor	Aluminum Tape	0.686	(17.42)
Overall Braid	Tinned Copper	0.732	(18.59)
Jacket	Orange FRPVC	0.870	(22.10)

Mechanical Specifications			
Performance Property	Units	US	(metric)
Bend Radius: installation	in. (mm)	3.00	(76.2)
Bend Radius: repeated	in. (mm)	9.0	(228.6)
Bending Moment	ft-lbs (N-m)	9.0	(12.20)
Weight	lbs/ft (kg/m)	0.542	(0.81)
Tensile Strength	lbs (kg)	660	(299.6)
Flat Plate Crush	lbs/in. (kg/mm)	300	(5.36)

Electrical Specifications			
Performance Property	Units	US	(metric)
Velocity of Propagation	%	76	
Dielectric Constant	NA	1.73	
Time Delay	nS/ft (nS/m)	1.34	(4.40)
Impedance	ohms	50	
Capacitance	pF/ft (pF/m)	26.7	(87.6)
Inductance	uH/ft (uH/m)	0.067	(0.22)
Shielding Effectiveness	dB	>90	
DC Resistance			
Inner Conductor	ohms/1000ft (/km)	0.63	(2.07)
Outer Conductor	ohms/1000ft (/km)	0.55	(1.8)
Voltage Withstand	Volts DC	5000	
Jacket Spark	Volts RMS	8000	
Peak Power	kW	62	

Environmental Specifications		
Performance Property	°F	°C
Installation Temperature Range	+23/+167	-5/+75
Storage Temperature Range	+23/+167	-5/+75
Operating Temperature Range	+23/+167	-5/+75

Attenuation vs. Frequency (typical)



Frequency (MHz)	30	50	150	220	450	900	1500	1800	2000	2500	3400	5800
Attenuation dB/100 ft	0.3	0.4	0.7	0.9	1.3	1.9	2.5	2.8	2.9	3.3	4.0	5.4
Attenuation dB/100 m	1.0	1.4	2.4	2.9	4.3	6.2	8.2	9.0	9.6	10.9	13.0	17.8
Avg. Power kW	13.21	10.18	5.77	4.74	3.25	2.24	1.69	1.52	1.44	1.26	1.06	0.77

Calculate Attenuation = $(0.057220) \cdot \sqrt{\text{FMHz}} + (0.000183) \cdot \text{FMHz}$ (interactive calculator available at http://www.timesmicrowave.com/cable_calculators)
Attenuation:
 VSWR=1.0 ; Ambient = +25°C (77°F)
Power:
 VSWR=1.0; Ambient = +40°C; Jacket = +75°C (167°F); Sea Level; dry air; atmospheric pressure; no solar loading

LMR[®]-900-LLPL Flexible Low Loss Plenum Coax



Connectors													
Interface	Description	Part Number	Stock Code	VSWR** Freq.	(GHz)	Coupling Nut	Contact Attach	Contact Attach	Inner Contact /Pin	Outer Body Length*	Finish* in (mm)	Width in (mm)	Weight lb (g)
1. 716 Male	Straight Plug	EZ-900-716-MC-PL-2	3190-1549	<1.25:1	(2.5)	Hex	Press Fit	Clamp	S/S	2.0	(51)	1.44 (36.6)	0.485 (220.0)
2. N Female	Straight Jack	EZ-900-NFC-PL-2	3190-1586	<1.25:1	(2.5)	NA	Press Fit	Clamp	S/G	2.0	(51)	1.38 (35.1)	0.443 (200.9)
3. N Male	Straight Plug	EZ-900-NMC-PL-2	3190-1585	<1.25:1	(2.5)	Hex/Knurl	Press Fit	Clamp	S/S	2.0	(51)	1.38 (35.1)	0.463 (210.0)

* Finish metals: N=Nickel, S=Silver, G=Gold, SS=Stainless Steel, A=Albally *VSWR spec based on 3 foot cable with a connector pair



Install Tools

Type	Part Number	Stock Code	Description
Strip Tool	ST-900C	3190-1310	For LMR 900 Clamp Style Connectors
Midspan Strip Tool	GST-900A	3190-435	For Ground Strap Attachment
Wrenches	WR-900	3190-510	1-1/4" Box Wrench (2 required)
Cutting Tool	CCT-01	3190-1544	Cable end flush cut tool
Replacement Blade	RB-01	3190-1609	Replacement blade for cutting tool



Hardware Accessories

Type	Part Number	Stock Code	Description
Ground Kit	GK-S900TT	GK-S900TT	Standard Grounding Kit (each)
Hoisting Grip	HG-900T	HG-900T	Split/Laced Type (each)
Cold Shrink	CS-A900T	CS-A900T	Cable to Antenna Junction (each)
Cold Shrink	CS-90120T	CS-90120T	LMR-900 to -1200 Junction (each)
Cold Shrink	CS-90170T	CS-90170T	LMR-900 to -1700 Junction (each)
Port Cushion	SC-900T-3	SC-900T-3	Three Cables (each)
Standard Entry Panels			Full Range of Port Styles/Combinations Available
Hanger Blocks	CB-900T	CB-900T	Dual Cable Support Block (kit of 10)
Hanger Block Supporting Hardware			Complete Range of Supporting Hardware and Adapters Available
Snap-in Hangers	SH-U900T	SH-U900T	Snap-in Hanger (Kit of 10)

LMR[®]-1200-LLPL Flexible Low Loss Plenum Coax

Ideal for...

- Indoor Plenum Feeder runs
- UL/NEC/CSA rated CMP/FT6
- Any wireless application (e.g. LMDS, MMDS, WLL, GPS, LMR, WLAN, WISP, WiMax, SCADA, Cellular, PCS, Paging) requiring an easily routed, low loss RF cable for in-building systems



- **LMR[®]-LLPL** is an indoor highly fire retarded cable intended specifically for runs within return air handling plenums (e.g. dropped ceilings, raised floors). It has a UL/NEC & CSA rating of ‘CMP’ and ‘FT6’ respectively.
- **Flexibility** and bendability are hallmarks of the LMR-1200-LLPL cable design. The flexible outer conductor enables the tightest bend radius available for any cable of similar size and performance.
- **Low Loss** is another hallmark feature of LMR-1200-LLPL. Size for size LMR has the lowest loss of any flexible cable and comparable loss to semirigid hard-line cables.
- **RF Shielding** is 50 dB greater than typical single shielded coax (40 dB). The multi-ply bonded foil outer conductor is rated conservatively at > 90 dB (i.e. >180 dB between two adjacent cables).
- **Weatherability:** LMR-1200-LLPL cables are designed for indoor Plenum applications. Black jacketed LMR-LLPL versions can be supplied for applications that originate outdoors (e.g., rooftop) and subsequently enter the building.

- **Connectors:** Type-N male and female connectors are available for LMR-1200-LLPL cable. Other interface types can be provided by using a short jumper cable assembly.
- **Cable Assemblies:** All LMR-1200-LLPL cable types are available as pre-terminated cable assemblies. Refer to the section on FlexTech for further details.

Part Description

Part Number	Application	Jacket	Color	Stock Code
LMR-1200-LLPL	Indoor/Outdoor Plenum CMP/FT6	FRPVC	Orange	54063

Construction Specifications

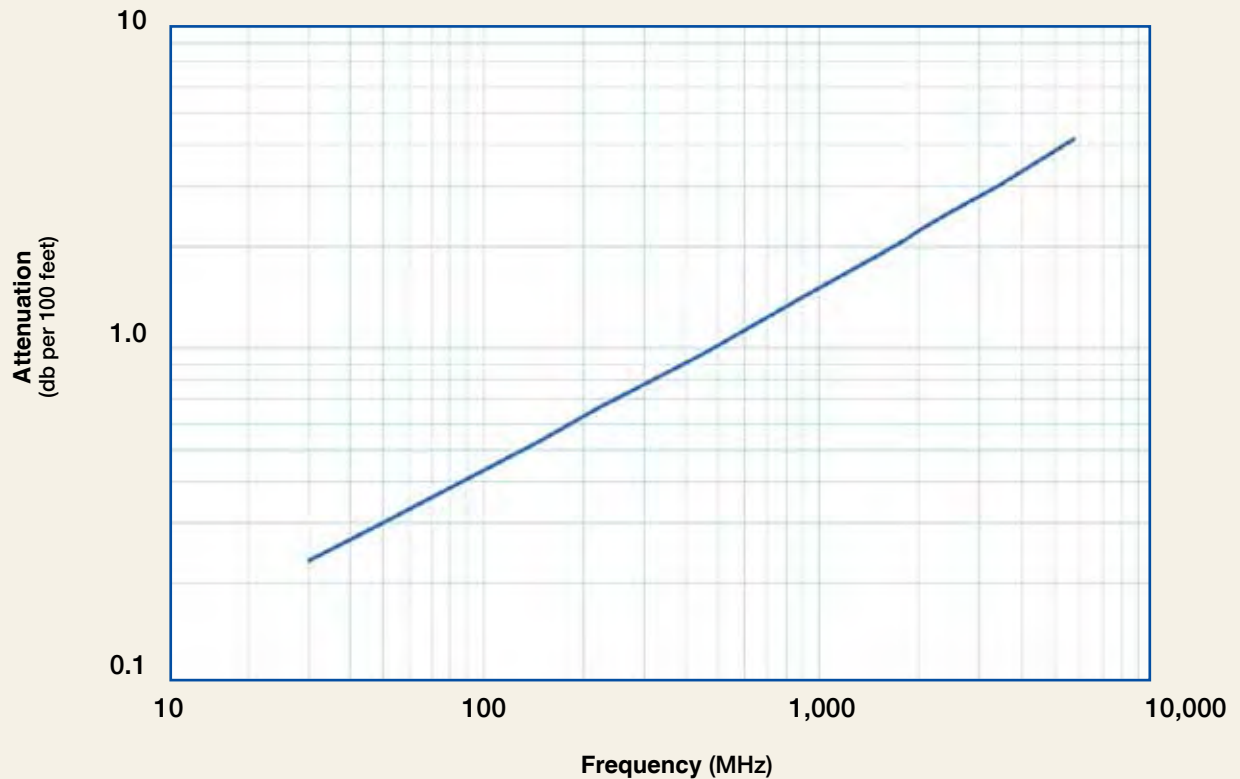
Description	Material	In.	(mm)
Inner Conductor	BC Tube	0.310	(7.87)
Dielectric	Low density PTFE	0.920	(23.37)
Outer Conductor	Aluminum Tape	0.926	(23.52)
Overall Braid	Tinned Copper	0.972	(24.69)
Jacket	Orange FRPVC	1.200	(30.48)

Mechanical Specifications			
Performance Property	Units	US	(metric)
Bend Radius: installation	in. (mm)	6.50	(165.1)
Bend Radius: repeated	in.s (mm)	12.0	(304.8)
Bending Moment	ft-lbs (N-m)	15.0	(20.34)
Weight	lbs/ft (kg/m)	0.7	(1.04)
Tensile Strength	lbs (kg)	975	(442.7)
Flat Plate Crush	lbs/in. (kg/mm)	375	(6.70)

Environmental Specifications		
Performance Property	°F	°C
Installation Temperature Range	+23/+167	-5/+75
Storage Temperature Range	+23/+167	-5/+75
Operating Temperature Range	+23/+167	-5/+75

Electrical Specifications			
Performance Property	Units	US	(metric)
Velocity of Propagation	%	76	
Dielectric Constant	NA	1.73	
Time Delay	nS/ft (nS/m)	1.34	(4.40)
Impedance	ohms	50	
Capacitance	pF/ft (pF/m)	26.7	(87.6)
Inductance	uH/ft (uH/m)	0.067	(0.22)
Shielding Effectiveness	dB	>90	
DC Resistance			
Inner Conductor	ohms/1000ft (/km)	0.37	(1.21)
Outer Conductor	ohms/1000ft (/km)	0.37	(1.2)
Voltage Withstand	Volts DC	6000	
Jacket Spark	Volts RMS	8000	
Peak Power	kW	90	

Attenuation vs. Frequency (typical)



Frequency (MHz)	30	50	150	220	450	900	1500	1800	2000	2500	3400
Attenuation dB/100 ft	0.2	0.3	0.5	0.7	1.0	1.4	1.9	2.1	2.2	2.5	3.1
Attenuation dB/100 m	0.8	1.0	1.8	2.2	3.2	4.6	6.2	6.9	7.3	8.3	10.0
Avg. Power kW	23.42	18.01	10.17	8.31	5.66	3.86	2.90	2.60	2.45	2.15	1.79

Calculate Attenuation =

$$(0.041720) \cdot \sqrt{\text{FMHz}} + (0.000183) \cdot \text{FMHz}$$

(interactive calculator available at http://www.timesmicrowave.com/cable_calculators)

Attenuation:

VSWR=1.0 ; Ambient = +25°C (77°F)

Power:

VSWR=1.0; Ambient = +40°C; Jacketr = +75°C (167°F); Sea Level; dry air; atmospheric pressure; no solar loading

LMR®-1200-LLPL Flexible Low Loss Plenum Coax



Connectors												
Interface	Description	Part Number	Stock Code	VSWR** Freq. (GHz)	Coupling Nut	Contact Attach	Inner Contact Attach	Outer Body /Pin	Finish*	Length in (mm)	Width in (mm)	Weight lb (g)
1. N Female	Straight Jack	EZ-1200-NFC-PL	3190-912	<1.25:1 (2.5)	NA	Press Fit	Clamp	S/S	2.0	(51)	1.65(41.9)	0.650(294.8)
2. N Male	Straight Plug	EZ-1200-NMC-PL	3190-911	<1.25:1 (2.5)	Hex	Press Fit	Clamp	S/S	2.0	(51)	1.65(41.9)	0.659(298.9)

* Finishes: N=Nickel, S=Silver, G=Gold, SS=Stainless Steel, A=Alballoy **VSWR spec based on 3 foot cable with a connector pair



Install Tools

Type	Part Number	Stock Code	Description
Midspan Strip Tool	GST-1200A	3190-436	For Ground Strap Attachment
Wrench	WR-1200A	3190-512	1-9/16" Box Wrench (1 required)
Wrench	WR-1200B	3190-511	1-7/16" Box Wrench (1 required)
Cutting Tool	CCT-01	3190-1544	Cable end flush cut tool
Strip Tool	ST-1200-CH	3192-124	For LMR-1200 clamp style connectors
Replacement Blade	RB-01	3190-1609	Replacement blade for cutting tool



Hardware Accessories

Type	Part Number	Stock Code	Description
Ground Kit	GK-S1200TT	GK-S1200TT	Standard Grounding Kit (each)
Hoisting Grip	HG-1200T	HG-1200T	Split/Laced Type (each)
Cold Shrink	CS-90120T	CS-90120T	LMR-900 to -1200 Junction (each)
Cold Shrink	CS-60120T	CS-60120T	LMR-600 to -1200 Junction (each)
Standard Entry Port Cushion	SC-1200T-3	SC-1200T-3	Three Cables (each)
Standard Entry Panels	Full Range of Port Styles/Combinations Available		
Hanger Blocks	CB-1200T	CB-1200T	Dual Cable Support Block (kit of 10)
Hanger Block Supporting Hardware	Complete Range of Supporting Hardware & Adapters Available		
Snap-In Hangers	SH-U1200T	SH-U1200T	Snap-In Hangers (Kit of 10)