SpaceNXT™ Q Series

Space Qualified Coaxial Cable Assemblies



SpaceNXT™ Q series, specifically designed and tested for next generation commercial space applications.

Smiths Interconnect's SpaceNXT™ product portfolio provides customers with a combination of highly reliable technology and lower cost of ownership that enables operators to overcome potential market entry barriers while enjoying the benefits of an established technology partner.

The SpaceNXT™ Q series is part of Smiths Interconnect's overarching initiative entailing the creation of an entire range of higher reliability products for next generation space applications that are readily available to the market.

All products have gone through extensive qualification testing in order to validate today's rigorous application requirements per customer and industry. Q series assemblies are made with low loss ePTFE insulation, and constructed with materials which meet the outgassing requirements of NASA/ESA when tested per ASTM E595. The outer jackets use an ETFE material for maximum radiation resistance. 105Q, 190Q, and 200Q product models are specifically designed for space flight applications on LEO, MEO, and GEO satellites and offered with standardized testing sequences, reducing delivery times and overall cost of ownership.

Features and Benefits

- Up to 40 GHz
- 100% Flight Test Data
- Low Loss Dielectric Material to Provide Low Attenuation
- Superior Shielding Effectiveness
- Direct Solder Sleeves to Outer Braids for Superior Reliability
- Vented Connector Designs Where Needed
- Stainless Steel Connectors or BeCu Connectors
- Phased Matched Pairs and Sets Available (standard tolerance is +/- one degree per GHz or +/-2.8 picoseconds)

Applications:

- Satellite Communication & Navigation
- Military, Commercial and Scientific Programs
- GEO/MEO/LEO and Small Satellites
- Manned Space Flight

Technical Characteristics

Electrical

	105Q	190Q	200Q
Frequency, Max (GHz)	40	32	18
Impedance, nominal (Ω)	50	50	50
Velocity of Propagation (%)	70	80	80
Shielding Effectiveness, 18 GHz (dB/ft)	> -110dB	> -90dB	> -90dB
Capacitance (pF/ft)	30	25	25
Delay (ns/ft), (ns/meter)	1.45, 4.761024	1.27, 4.17	1.3, 4.268504
Attenuation k1 (db/100ft) @ 23 deg C	0.576	0.28	0.222
Attenuation k2 (db/100ft) @ 23 deg C	0.00099	0.000179	0.000175

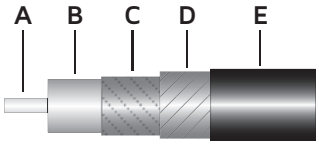
Attenuation (Typical) at any Frequency = k1 x SqRt (FMHz) + k2 x (FMHz)

Mechanical & Environmental

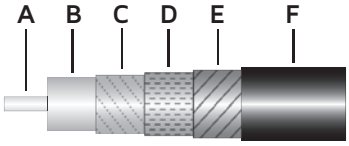
Weight (lbs/100ft), (Kg/100m)	1.28, 1.90	3.30, 4.96	4.40, 6.61
Temperature Range (˚C)	-55˚C to +150˚C	-55˚C to +150˚C	-65˚C to +150˚C
Minimum Bend Radius (inch), (mm)	0.625, 15.87	0.95, 24.13	1.00, 25.40

Construction

Inner Conductor (inch)	A	Solid SCCS	Solid SC	Solid SC
Dielectric (inch)	B	Solid PTFE	Tape Wrap PTFE	Tape Wrap PTFE
First Outer Shield (inch)	C	SPC Spiral	Flat Braid SPC	Flat Braid SPC
Second Outer Shield (inch)	D	SPC Round	Metalized Tape	Metalized Tape
Third Outer Shield (inch)	E	-	Round Braid SC	Round Braid SC
Jacket (inch O.D.)	F	0.105, ETFE	0.190, ETFE	0.200, ETFE



SpaceNXT™ 105Q



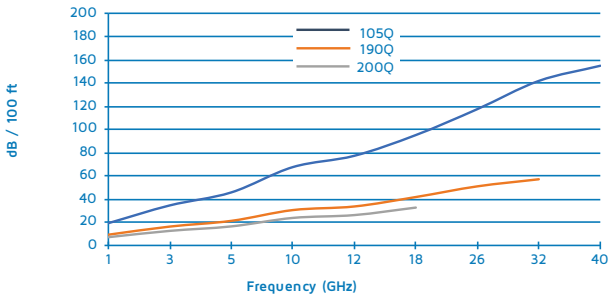
SpaceNXT™ 190Q and 200Q

Attenuation (dB/100ft)

GHz	105Q	190Q	200Q
1	19.2	9.4	7.2
3	34.5	16.4	12.7
5	45.7	21.4	16.6
10	67.5	30.8	24.0
12	74.22	33.9	26.4
18	95.1	42.1	33.0
26	117.43	51.4	
32	133.37	57.6	
40	154.8		

Typical Cable Loss at +25° C & Sea Level

Attenuation vs Frequency

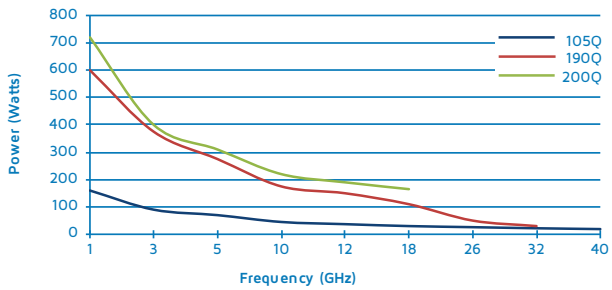


Average Power Rating (Watts)

GHz	105Q	190Q	200Q
1	160	600	720
3	90	375	400
5	70	275	310
10	45	175	220
12	37	150	190
18	30	110	165
26	26	50	
32	22	30	
40	19		

Typical Cable Loss at +25° C & Sea Level

Average Power Rating



Technical Characteristics

Cable Code	Connector Code	Series	Gender	Type	C-Nut Style[1]	Body Material[2]	Body Finish[3]	Loss per GHz	Frequency Max GHz
105Q	KFS	2.9mm	Female	Straight	N/A	SS	P	0.015	40
105Q	KMS	2.9mm	Male	Straight	H	SS	P	0.01	40
105Q	SFS	SMA	Female	Straight	N/A	SS	P	0.015	18
105Q	SMPFS	SMP	Female	Straight	N/A	Be	G	0.01	40
200Q	TMS	TNC	Male	Straight	H	SS	P	0.01	18
200Q	NMS	Type-N	Male	Straight	H	SS	P	0.01	18
105Q, 190Q, 200Q	SMS	SMA	Male	Straight	H	SS	P	0.01	18
190Q	KMR	2.9mm	Male	R/A	H	SS	P	0.02	32
190Q, 200Q	SMR	SMA	Male	R/A	H	SS	P	0.02	18
190Q	KMS	2.9mm	Male	Straight	H	SS	P	0.01	32
200Q	KMS	2.9mm	Male	Straight	H	SS	P	0.01	18
200Q	TMR	TNC	Male	R/A	H	SS	P	0.02	18

[1]C-nut Style: H= Hex, K=Knurled, HK= Hex Nut & Knurled
[2]Body Materials: B=Brass, SS=Stainless Steel, Be= Beryllium Copper
[3]Body Finish: N= Nickel, S=Silver, G=Gold, P= Passivated, T= Tri-metal
Sex of connector is determined by center pin

Cable Code	Option Code	Option Description	Option Details
105Q 190Q 200Q	+/-2.8ps	Phase Match	Standard Tolerance of +/-2.8ps

*for phase matched assemblies (+/-2.8ps) is required to be added to the end of standard part number
example: NMS-200Q-120.0-NMS +/-2.8ps

Custom Options:
The above connectors and options represent the most common types used. Smiths Interconnect offers a wide range of cables, connectors and options. If you do not see an option you require please consult the sales department.

Qualification Summary

Test Plan	Description	
TP-9229	**Internal Test Procedure for Phase Over Temperature Requirements**	
Products Tested	**QTY**	**Testing Sequence**
KMS-105Q-48.0-KMS +/-2.8ps	4	1,2
KMS-190Q-48.0-KMS +/-2.8ps	4	1,2
SMS-200Q-48.0-SMS +/-2.8ps	4	1,2
Testing Sequence 1	**Requirements**	**Results**
Phase Match Assemblies	+/-2.8ps	Pass
VSWR and Insertion Loss	Per Cable Specifications	Pass
Phase Over Temperature	Characterization Test	Recorded
VSWR and Insertion Loss	Per Cable Specifications	Pass
Testing Sequence 2	**Requirements**	**Results**
Phase Tracking Over Temperature	Measure and Record Results	Recorded
TP-9140	**Internal Test Qualification Procedure for Space Flight Cables**	
Products Tested	**QTY**	**Testing Sequence**
SMS-200Q-12.0-SMS	7	2
SMS-105Q-12.0-SMS	5	2
SSMS-060Q-12.0-SSMS	5	2
SMS-200Q-39.4-SMS	4	3
TMS-200Q-39.4-TMS	4	3
Cable 200Q	4 ft.	1
Cable 190Q	1 ft.	1
Testing Sequence 1	**Requirements**	**Results**
Group A Inspection Tests	Per MIL-DTL-17H	Pass
Group B Inspection Tests	Per MIL-DTL-17H	Pass
Testing Sequence 2	**Requirements**	**Results**
Insertion Loss (pre-Radiation)	Per Cable Specifications	Pass
Radiation Dosage	Cables Exposed to Various Levels of Radiation	Recorded
Insertion Loss (post-radiation)	Measure and Record Delta to Original Results	Recorded
Testing Sequence 3	**Requirements**	**Results**
DWV	Mil-STD-202 Method 301	Recorded
Radiation Dosage	Measure and Record Results	Recorded
Random and Sine Vibration	MIL-STD-202 Method 214A Conditions IIG, Swept Sine, 5-100Hz, 2 oct/min	Recorded
Thermal Cycles	100X Thermal Cycles	Recorded
Shielding Effectiveness	Measure and Record Results	Recorded
CW Power	Measure and Record Results	Recorded
Connector Retention	Measure and Record Results	Recorded
X-ray	MIL-STD 202 Method 209	Recorded
DPA	Verification of Mechanical Integrity	Recorded
VSWR and Insertion Loss	Recorded Between Each Step Above	Pass

Summary: Cable and connectors individually all passed industry requirements outlined in MIL standards for group A and B tests.
Cable assemblies, after going through testing sequences, eventually passed. One noted exception was SMA male connectors which saw increased VSWR after tests performed in sequence 3 testing per TP-9140. Cause of failures was identified during DPA.

How To Order

			_			Q	_		.		_				
1				2				3				4		5	

1 Connector #1

KFS	2.9mm Female Straight	KMR	2.9mm Male R/A	KMS	2.9mm Male Straight
NMS	Type N Male Straight	SFS	SMA Female Straight	SMPFS	SMP Female Straight
SMR	SMA Male R/A	SMS	SMA Male Straight	TMR	TNC Male R/A
TMS	TNC Male Straight				

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2 Cable *(fixed)*

105	SpaceNXT™ 105Q	190	SpaceNXT™ 190Q	200	SpaceNXT™ 200Q

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3 Length *(inches)*

36.0 Example: 36 in.

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4 Connector #2

SMS	SMA Male Straight	NMS	Type N Male Straight	KMS	2.9 mm Male Straight

5 Assembly Option

+/-2.8ps	+/-2.8ps Phase Matched Electrical Length	_	None

Global
Support



RFMW is a globally franchised distributor for Smiths Interconnect.
A list of local offices is available at www.rfmw.com/contact/29

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