Space Flight RF Cable Assemblies

UTiFLEX®, Semi-Rigid, Multiport Harnesses

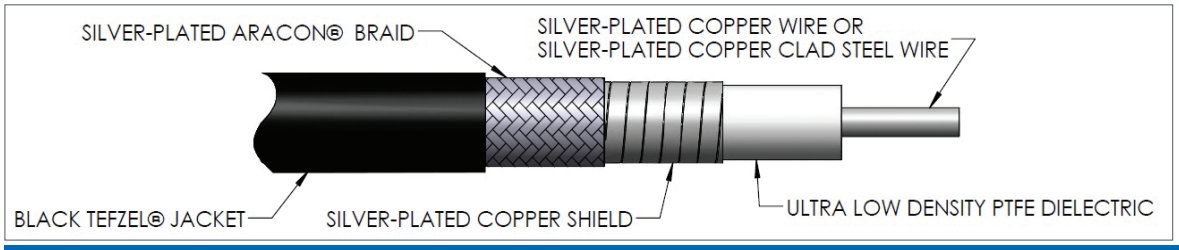
INTRODUCTION

Amphenol CIT has supplied high-reliability RF coaxial cable assemblies, flexible and semi-rigid, for space flight applications—earth orbit and beyond, manned and unmanned missions—for over three decades. With robust Amphenol CIT connector designs tailored to the Amphenol CIT cable creating an optimized cable assembly, our extensive track record in providing microwave transmission line products means you can partner with us to deliver proven solutions against your most demanding space flight technical challenges to include operating frequency through V-band, Power Handling (CW, Multipactor, Ionization), PIM, Radiation, Thermal Vacuum, and Cryogenic operation to name a few. The Amphenol CIT product has been qualified to many program-specific requirements and can be supplied against NASA EEE-INST-0002 and ESCC 3408.

The most popular product lines for space flight cable are the UTiFLEX® MCJ type constructions incorporating KEVLAR® based metalized fibers called ARACON®. This ultralight, stronger than steel material provides tremendous opportunities for weight savings without a sacrifice in performance over conventional coaxial cable. These lighter coaxial cables, with the lowest loss per gram of mass, are a critical component to reduce launch costs or increase payload capacity for many satellite customers.

Amphenol CIT's capabilities and experience allow our customers to make sure they have both a reliable and affordable solution that works every time and mitigates program risk.

MCJ Cable Construction



CONSTRUCTION FEATURES & BENEFITS

Feature	Benefit
Space-rated Materials	All materials verified to <1% TML and <0.1% CVCM outgassing and restrict typical prohibited materials such as pure tin, cadmium, and zinc
Pre and Post Assembly Thermal Conditioning	Stress relief of materials guaranteeing stable and repeatable RF performance throughput the life of the mission
Burr free components and plating quality checks exceeding industry standards	Eliminates the risk of contamination during mating and integration
Degolding per NASA-STD-8739.3 and J-STD-001ES	Prevents potential gold embrittlement of the solder joint
Real Time X-ray	Verifies proper connector to cable termination, solder fill, and solder workmanship to the stringent requirements of the space customer
100% Test and Inspection of Electrical and Mechanical Requirements	Allows for receipt and integration of the cable assembly without additional quality checks

UTIFLEX® CONFIGURATIONS Other flexible configurations available

Cable	Frequency Range	K1 per ft : K2 per ft*	Mass	VofP	MIN Bend Radius	Connector Options**
MCJ088D	DC–70 GHz	20.335 : 0.153	3.6 g/ft	80%	0.25 in.	#12/#16 Contacts, SMA, SSMA, SMPM, SMP, SMK, 1.85 mm
MCJ115A	DC–53 GHz	14.886 : 0.073	5.5 g/ft	82%	0.38 in.	SMA, SMK, 2.4 mm
MCJ142A	DC–40 GHz	10.014 : 0.111	8.8 g/ft	83%	0.38 in.	#12/BMB (#8) Water Resistant Contacts, SMP, SMA, SMK, TNCA
MCJ185A	DC–33 GHz	8.081 : 0.110	12.4 g/ft	83%	0.38 in.	BMB (#8) Water Resistant Contacts, SMA, SMK
MCJ205A	DC–26.5 GHz	6.984 : 0.109	16.0 g/ft	83%	0.50 in.	BMB (#8) Water Resistant Contacts, SMA, 3.5 mm, SMK, TNCA, L-band Multipactor Resistant TNC
MCJ311A	DC–18 GHz	4.429 : 0.112	35.0 g/ft	84%	1.25 in.	BMB (#8) Water Resistant Contacts, SMA, 3.5 mm, TNCA, L-band Multipactor Resistant TNC and SC

*Attenuation (db/100Ft) = K1√F + K2 F where F is Frequency in GHz. Connector loss must be considered for the loss of the cable assembly.
** Contacts on cable ends are often integrated into circular, rectangular or custom shells in multi-port harness assemblies. Contact Amphenol CIT Engineering for support in specifying many time saving and mass saving multi-port options.

SEMI-RIGID CONFIGURATIONS Other semi-rigid configurations available

Cable	Frequency Range	K1 per ft : K2 per ft*	Mass	VofP	MIN Bend Radius	Connector Options
UT-085-DS	DC–50 GHz	20.09 : 0.839	6.4 g/ft	70%	0.050 in.	SMPM, SMP, SMA, SMK, 1.85 mm
UT-085C-LL	DC–65 GHz	17.334 : 0.218	6.3 g/ft	77%	0.250 in.	SMPM, SMP, SMA, SMK, 1.85 mm
UT-141-DS	DC–26.5 GHz	9.15 : 0.230	14.9 g/ft	70%	0.750 in.	SMA, SMK, TNCA
UT-141C-LL	DC–26.5 GHz	10.669 : 0.874	14.4 g/ft	77%	0.500 in.	SMA, SMK, TNCA

*Attenuation (db/100Ft) = K1√F + K2 F where F is Frequency in GHz. Connector loss must be considered for the loss of the cable assembly.

SPACE FLIGHT HERITAGE

Commercial	ACeS, Thuraya, Optus, Inmarsat, Amazonas, Anik, Nimiq, Hylas, KaSat, Sirius, Atlantic Bird, Alphasat, SES, E3B, M3B, AM4R, DirecTV, MSV, Mexsat, SkyBrazil, AM5/6, Africasat, NPOESS, Worldview-III, Telstar 12, E-172B, Jabiru, AMOS, BRISat, QZSS, T16, E5WB
NASA	Cassini Probe, TDRS, COSMIC-II, icesAT, GRACE, SWOT, MAVEN, Osiris-Rex, GOES, Lunar Flashlight, James Webb Space Telescope, RRM, NEAScout
ESA/JAXA	Galileo, MetOp, SaoCom, MMO, Asnaro, Planet-C, Sprint-A, IKAROS, Astro-H

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