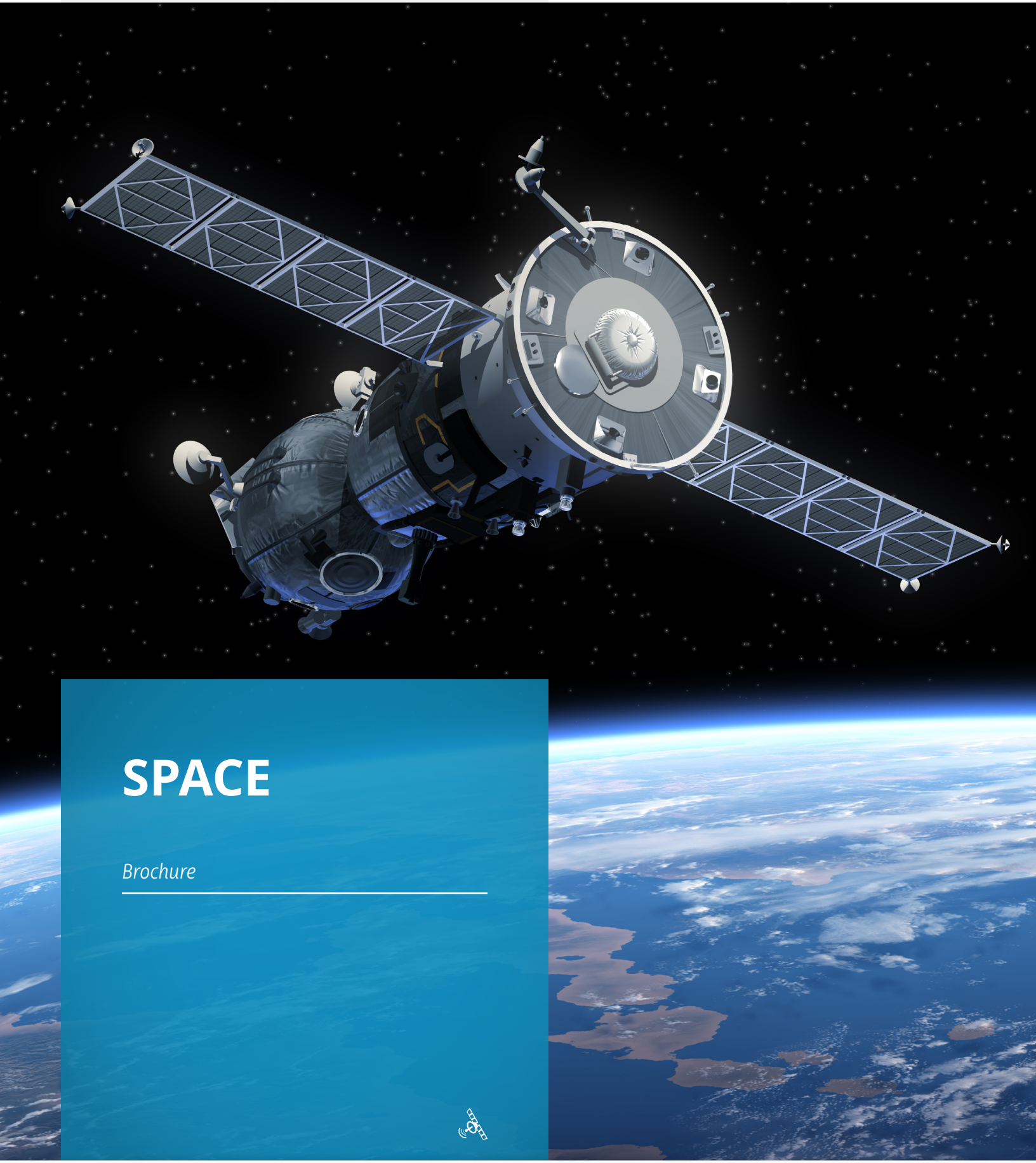

SPACE

Brochure

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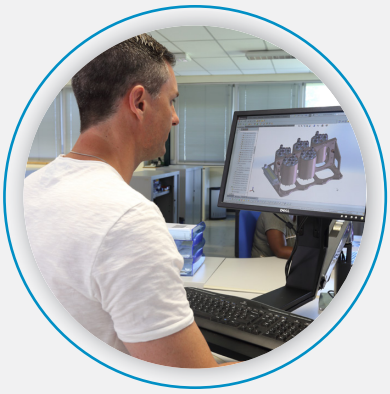
Radiall™

SIMPLIFICATION IS OUR INNOVATION

Radiall is the preferred choice across the globe when quality, reliability, and performance are mission critical. With space heritage dating back to 1974 and involvement in more than 300 satellite programs, our reliable solutions have established a strong reputation. Our complete range of Space Qualified passive products includes a wide range of coaxial connectors, cable assemblies, microwave components and switches with a frequency range up to Q band.

QUALITY **SPACE SOLUTIONS**



Design

Manufacturing

Test Capabilities

DESIGN

The design of all Radiall space products is done at our state-of-the-art Isle d'Abeau plant in France by space engineers who are dedicated to developing high performance, reliable product solutions. To ensure that customers specific needs for dedicated applications are met, our engineers use the following tools to design and model components:

- *Audros*
- *ANSYS*
- *Solidworks*
- *CST Microwave Studio*
- *Cosmosworks*
- *HFSS*

MANUFACTURING

Radiall space qualified products are manufactured within our 600m² ISO 7 and ISO 8 clean rooms. This guarantees that our customers are receiving the highest quality components on the market.

TEST CAPABILITIES

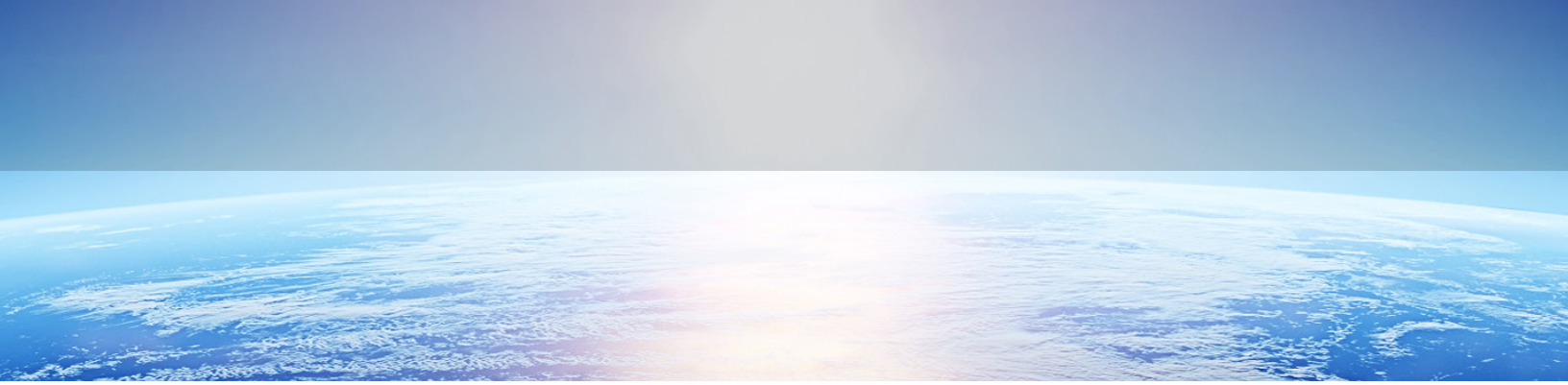
At Radiall, we understand the importance of being able to determine if our products meet environmental and space specifications. To ensure that customers are receiving high performance and qualified components, the following in-house test equipment are available:

- *Vector Network Analysers*
- *Thermal chamber with nitrogen injection*
- *Thermal vacuum chambers (photo presentation)*
- *Automatic test benches for electrical switches parameters*
- *X-ray equipment*
- *Multipaction and Power handling test bench (2000W peak and 400WCW L-band)*
- *Vibration shakers (up to 50grms)*
- *Half sine shock machine (up to 4200g)*
- *Reverberation chamber for EMC measurements*

SPACE HERITAGE

Note

This list of satellites includes many but not all satellites and is thus not fully comprehensive.



COAXIAL CONNECTORS

Includes a wide range of 50ohms coaxial connectors with a frequency range up to Q band

- ESA QPL SMA interface up to 22 GHz with male, female and adaptors variants
- ESA QPL SMA2.9 interface also called SMK, up to 40 GHz
- ESA QPL Very high power TNC interface up to 8 GHz
- TNC Line providing higher performance with screw-on concept: high power versions up to 8 GHz and high frequency version up to 18 GHz
- SMP microminiature interface for high frequency applications with great misalignment tolerances: 40 GHz/Snap-on (blind mate)
- SMP-LOCK: fully compatible with SMP interface and offers a secure connection due to a robust locking system
- 2.4mm interface: male, female and adapters up to 50 GHz

COAXIAL ATTENUATORS

A range of low power coaxial attenuators qualified by ESA (European Space Agency)

- SMA interface available from DC to 22 GHz: 10 dB/0.5 dB, 11-20 dB/1 dB step and Dissipated power: 2W
- SMA2.9 interface up to 31.5 GHz: 0-10 dB/0.5 dB step
- SMP LOCK interface DC to 22 GHz: 0-10 dB/0.5 dB step, 15 and 20 dB

COAXIAL TERMINATIONS

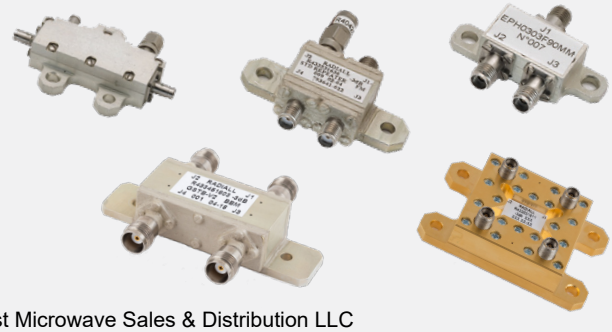
Low power coaxial loads qualified by ESA (European Space Agency) and high power versions

- Low power SMA loads up to 2W: ESA QPL (3403/006) up to 22 GHz
- High power SMA loads: Remote loads / 5W DC - 18 GHz / 45W 1 - 6 GHz
- Low power SMA2.9 loads 1W: ESA QPL (3403/009) up to 40 GHz
- Low power TNC loads: EPPL Part 2 / 2W up to 18 GHz
- Low power SMP/SMP-LOCK loads up to 1W up to 22 GHz

COAXIAL COUPLERS AND DIVIDERS

Passive couplers DC-22 GHz and power dividers DC-31 GHz which offer admissible power up to 200 WCW

- Directional coupler with low power SMA connectors (5 to 30 dB) or high power TNC connectors (5 to 32 dB)
- 3 dB hybrid coupler with low power SMA connectors or high power TNC connectors
- 2 - 4 - 8 way dividers with Wilkinson Technology



FLEXIBLE COAXIAL CABLE ASSEMBLIES

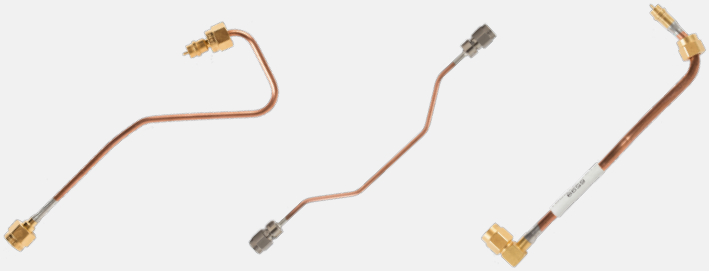
High performance (depending on selected variant), lightweight, low loss, high flexibility and high power - CNES ASF since 2007 (Agrément de Savoir Faire: Capability Approval)

- SHF 2.4MS: with SMA or SMP-LOCK connectors (18g/m - 2.91 dB/m at 18 GHz)
- SHF 3MS: with SMA connectors (35 g/m - 2.35 dB/m at 18 GHz), SMA2.9 or SMP-LOCK (35 g/m -3.19 dB/m at 31 GHz)
- SHF 4.8MS: SMA interface (41 g/m - 1.19 dB/m at 18 GHz) or SHF 4.8MS ULL32 with SMA2.9 for Ka Band (41g/m - 1.65 dB/m at 32 GHz), high radiation capability: 120 MRAD
- SHF 5MS: SMA connectors (53.5g/m - 1.02 dB/m at 18 GHz), SMA2.9 (53.5g/m - 1.27 dB/m at 26.5 GHz) or TNC (53.5 g/m - 1.02 dB/m at 18 GHz), high radiation capability: 80 MRAD
- SHF 8MS: with SMA (118g/m - 0.68 dB/m at 18 GHz), low power TNC (118g/m - 0.68 dB/m at 18 GHz) or High power TNC (118g/m - 0.44 dB/m at 8 GHz), high radiation capability: 80 MRAD
- ESA QPL SHF 8MS (3408/001) : with Very high power TNC (118g/m - 0.68dB/m at 8 GHz), high radiation capability: 120 MRAD

COAXIAL SEMI-RIGID CABLE ASSEMBLIES

Solid tubing technology which allows definitive and high precision forming: CNES ASF since 2007 (Agrément de Savoir Faire: Capability Approval)

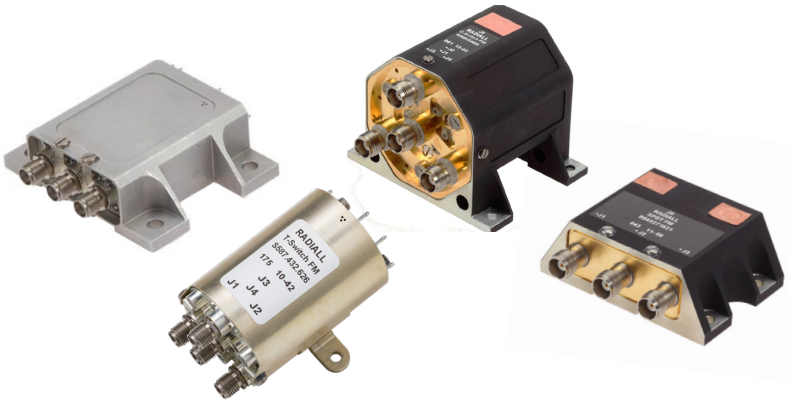
- .085" and .141"with ESCC qualified SMA connectors
- .085" and .141" microporous low loss with ESCC qualified SMA2.9 connectors
- Customized bending



COAXIAL SWITCHES

Extended life cycle (18 years and more than 100,000 actuations) with high RF performance and excellent repeatability

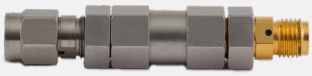
- Low power SPDT , DPDT and DP3T based on our standard range of switches (RAMSES) with SMA (DC - 22 GHz) or SMA2.9 connectors (DC - 31 GHz)
- Low power Random or Sequential T switch with SMA, SMP-LOCK connectors (DC - 22 GHz) or SMA2.9 connectors (DC - 31 GHz)
- High power SPDT, DP3T and Random T switch



PHASE SHIFTERS

Mechanical adjustable phase shifter with variation in the physical length of the transmission line

- Available with SMA male or female connectors up to 18 GHz and 180°



SIMPLIFICATION
is our **INNOVATION**

We advance the design and engineering process for innovators, ground-breakers and pioneers of technology. We reduce weight, improve durability and streamline installation to provide leading-edge connectors that drive product performance.

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