



# DEFENSE

Booklet



SIMPLIFICATION IS OUR INNOVATION





- 
- *Radar*
  - *Countermeasure*
  - *Jammer*
  - *Optical Pod*
  - *Tactical Communication*
  - *Embedded Computer*
  - *EWIS*



# FOREWORD

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Radiall is a leading supplier of interconnect solutions in the defense industry. We are recognized for our innovative solutions that ensure easy and reliable connections in systems that require high performance and small form factor for military platforms in air, land and sea.

Our global presence allows us to support key defense players on a local level.

Radiall has developed a broad and unique product portfolio offer in:

- *RF connectors and cable assemblies*
- *Optoelectronics*
- *Optical interconnect systems*
- *Microwave systems*
- *Multipin solutions*



# RADAR & ELECTRONIC WARFARE

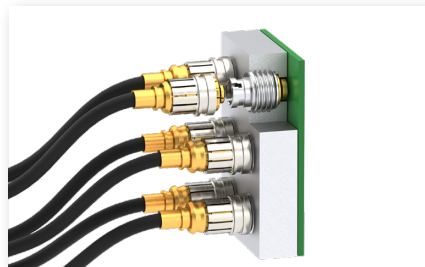
Radars are designed to provide the most accurate view of the modern battlespace. Depending on the mission, a radar can ensure early warning, IFF, surveillance, tracking or multi-role missions. Radiall can address custom requirements to fit every need, from high performance and solderless RF connectors to high bandwidth end-to-end optical solutions for data processing.



## HDQX SERIES

Radiall's High Density Quadax (HDQX) connector range provides high-speed communication solutions (transmission of Ethernet and RF high-speed signals) by combining compact and rugged qualities for high reliability and signal integrity.

- Rectangular shape: space-saving
- Simple and secure with a central locking device
- Lightweight composite strain relief



## RF HYBRID IMP CONNECTOR

Radiall's IMP LP is designed to optimize the link between PCB and front chassis. In conjunction with SMP-Lock technology, the IMP Hybrid secures connections for high vibration.

- High frequency: 18 GHz
- Axial tolerance: 0.36 mm
- Board-to-Board distance: typ. 2.85 mm<sup>[1]</sup>
- Diameter: 3.90 mm



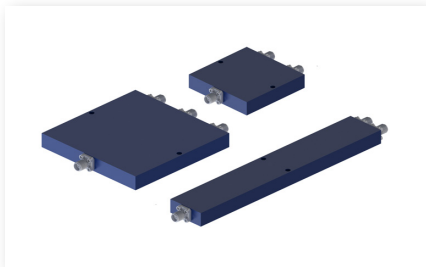
## RF TERMINATIONS

Radiall provides a wide range of terminations in standard coaxial interfaces from DC to 67 GHz up to 1000 W.

- Compatible with all types of RF connectors (BNC, TNC, SMA, SMA 3.5, SMA 2.9, SMA 2.4)
- Frequency from DC to 67 GHz
- Power up to 1000 W
- Qualified for harsh environments per MIL-DTL-39030

1. Custom designs on demand





### RF POWER DIVIDERS

Radiall's new range of power dividers combines mechanical robustness and high electrical performance up to 26.5 GHz.

- Comprehensive offer from 0.22 GHz to 26.5 GHz
- 2/3/4/6/8 way division
- High RF performance, robust design, compliant with MIL-STD-202G
- Wilkinson design: can be used as a power combiner



### Q-MTITAN™ ARINC 846

The Q-MTITAN™ ARINC 846 contacts bring multi-fiber capability through one standard size #8 quadrx cavity. Its innovative design protects the widely used MT ferrule and provides a sealed and rugged interconnect that withstands high temperature ranges and vibration levels.

- Temperature range: -55 °C to +125 °C
- Durability: 500 mating cycles
- Vibration: 41.7 Grms
- Cable retention: 68 N on round cable



### LUXCIS® ARINC 801 APC

LuxCis® ARINC 801 is a keyed fiber optic contact designed to offer excellent optical performance in single-mode APC. Radiall offers a complete interconnect product range with LuxCis® ARINC 801 compatible with standards such as ARINC 600 and MIL-DTL-38999.

- Single-mode APC: IL : 0.1 dB / RL > 65 dB
- Temperature range: -55 °C to +125 °C (cable dependent)
- Wide product range available: single-channel, circular and rectangular multipin connectors

# MUNITIONS

Munitions, such as missiles, are made of dense subsystem arrangements embedded in a small package. They encompass a wide range of needs, from ultra-flexible and compact RF interconnect solutions and high-speed data, to free-space solutions that are capable of transmitting mission data in extremely demanding outdoor environments.



## RF SWITCHES

Our wide range of microwave coaxial switches are highly reliable, due to the Radiall Modular System for Electromechanical Switches (RAMSES). RAMSES is a patented concept that enables a typical operating life of 10 million cycles while ensuring no degradation in contact resistance reliability over time.

- Frequency up to 52 GHz
- Multiple configurations available
- Low insertion loss



## GNSS ANTENNAS

Radiall has developed and produced antennas for artillery munitions from 76 mm to 155 mm caliber in GNSS and telemetry bands. These products are mechanically cylindrical or conical and can withstand an acceleration of 20,000 g.

- GNSS bands (GPS L1/ L+L2/Gallileo, Glonass)
- Telemetry band up to 2.3 GHz
- Suitable for critical environments (20,000 g acceleration)
- Omnidirectional antennas



## F-LIGHT

F-Light is a free-space optical datacom product that is dedicated to short-range data transmission. The unique design fits mezzanine communication setups and provides a new interconnect architecture concept to electronics designers.

- Data rates from 100 Mbps to 5 Gbps
- Tolerant to high misalignment
- Compliant with MIL-AERO environments







### SMP-LOCK® WITH SHF2.2UF

SMP-LOCK® combines SMP electrical performance with an additional locking mechanism that features high retention force suitable for harsh mechanical stress.

- High frequency: 40 GHz
- Retention force: 450 N
- Vibration and shock: compliant with MIL-STD-202



### ALUMINUM QUICKFUSIO

Radiall has adapted QuickFusio™ to meet demanding requirements with a more robust design, including an aluminum-machined body. Designed for MIL applications, the Aluminum QuickFusio™ is an easy-to-install compact solution.

- Robust design and simple wiring: SAE-AS-38999 accessories
- Quick mating



### SMPM

The SMPM connector is designed for very high frequency applications where space and package density are required. 30% smaller than SMP and intermateable with GPPO® products, SMPM is available in two levels of retention: full detent and smooth bore.

- High frequency: 65 GHz
- Radial misalignment:  $\pm 0.25$  mm
- Axial misalignment:  $0/+0.25$  mm

# LAND

New requirements for military users drive the need for new tactical radios designed for harsh environments. Radiall has the most complete range of RF coaxial passive products including inside- and outside-the-box PCV connectors, small diameter cable assemblies, micro switches and antennas. Moreover, the latest generation of countermeasures, radar and optical pod systems embedded on land vehicles require high performance and ruggedized interconnect technology.



## EXOBEAM™ HARNESS

ExoBeam™ connectors (MIL-DTL-83526) utilize Expanded Beam technology to provide a non-contact fiber optic connection that is more resistant to the presence of contamination and more durable than connectors utilizing physical contact technology.

- Single-mode (1210/1550 nm) and multi-mode (850/1300 nm) fiber
- Hermaphroditic coupling for quick mating in the field
- Robust design for up to 3,000 cycles



## SMT QUARTZ RELAY

To overcome the frequency limits of SMT switches, Radiall employs the RAMSES concept with the SLIM LINE technology in the Quartz series. This new series is a major evolution capable of handling up to 26.5 GHz.

- Small size
- High frequency: 26.5 GHz
- Long life span: 5 million typical cycles



## TACTICAL COMM ANTENNA

Radiall offers a wide range of Tactical Communications Antennas (VHF/UHF/L/S Band) dedicated to manpack radios. Several form factors are available including whip, blade and plastic overmolded. These antennas are available as mono-band or multi-band and can withstand harsh environmental conditions (IP67/68, salt fog, vibrations) per MIL-STD-810G.

- 30 MHz to 3 GHz
- Whip, blade and plastic overmolded form factors
- IP67/68, complies with MIL-STD-810G





### GNSS ANTENNAS

Radiall offers a global range of GNSS antennas in GPS L1, L1/L2, Galileo, Glonass and Beidu bands. Several form factors are available including stub and square. These antennas can be active or passive and can withstand harsh environmental conditions (IP68, salt fog, vibrations) per MIL-STD-810G.

- *Multi-frequencies: GPSL1, L1/L2, Galileo, Glonass, Beidu*
- *Stub or square form factor*
- *Active and passive antennas*
- *IP68, complies with MIL-STD-810-G*



### NSX FOR LAND SYSTEMS

Radiall has adapted its NSX offer to meet the needs of compact systems that require high-density interconnect solutions with a more robust design, including a sealing option and 360° EMI shielding protection with EMI spring and backshell. This Rack & Panel solution opens new possibilities for vehicle equipment and power units that face particularly harsh environments.

- *Robust and compact design*
- *New insert for power contacts*



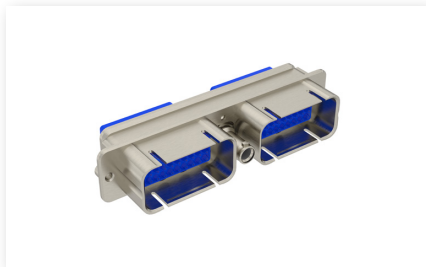
### PHASE-MATCHED SHF CABLES

Radiall is a leading manufacturer of high frequency, low loss, high performance cable due to its mastery of foam PTFE wrapping technology. Radiall's SHF cable offering includes phase-matched cable assemblies for radar applications. A complete set of phase-matched, time-delay-matched or amplitude-matched SHF cable assemblies are available.

- *Typical phase matching:  $\pm 0.28^\circ/\text{GHz}$*
- *Ultra low loss*

# UNMANNED

*The demand for unmanned aircraft in the modern battlespace is rising and pushing the market to have more complex payloads and sensors on increasingly compact vehicles. Size, weight, ease of installation and maintenance are some of the key technical challenges we face in designing relevant interconnect solutions.*



## EPXB2 LIGHTWEIGHT DISCONNECT

With the increasing demand for weight-saving connection solutions, Radiall now offers an alternative EPXB2 with 21% weight savings compared to the standard EPXB2 aluminium connector.

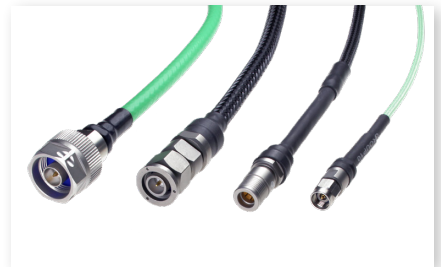
- Modular and user-friendly connector: fully intermateable
- Space-saving solution
- Cost-saving solution
- EN 4644 European standard



## QUICKFUSIO™

QuickFusio™ is a quick mate miniature connector designed for installation where accessibility and density are critical. This innovative connector series offers weight savings and simple wiring without compromising performance. It is available in two different versions to meet the most stringent requirements.

- Lightweight solution: 20 grams per pair
- Simple wiring: SAE-AS-38999 accessories
- Quick mating



## AIRFRAME LOW LOSS CABLES

Flat wire braiding and lighter wrapping make Radiall's AirFrame range the best choice for on-board surveillance systems, drones and fighter aircraft. Radiall's AirFrame cable range combines the top RF performance levels and the highest resistance to abrasion on the market.

- Ultra low loss, accurate phase-matching, lightweight
- Available with many interfaces: SMA, QRE, BMA, TNC 18, N18
- Fluid resistant (Skydrol)





### LOW LOSS ULTRA-FLEXIBLE SHF3UF CABLE WITH SMA 2.9 SELF-LOCK CONNECTION

This ultra-flexible lightweight cable is perfectly suited for Ku/Ka Satcom systems requiring long-lasting solutions and excellent reliability. By combining it with Radiall's SMA 2.9 self-lock solution, customers receive a secure and quick cable assembly connection.

- Flexure life cycle: 140,000
- High chemical resistance (oil, lubricant, cleaner, antifreeze agent)
- Compatible with all standard SMA and SMA 2.9 jacks



### SMPW SERIES

The defense market requires smaller interfaces that are lightweight, robust and capable of higher frequencies and data rates. Radiall's SMPW features a frequency range from DC to 100 GHz and is intermateable with the G3PO™ interface.

- DC to 100 GHz
- Radial misalignment: up to 2.2°
- Axial misalignment: up to 0.3 mm



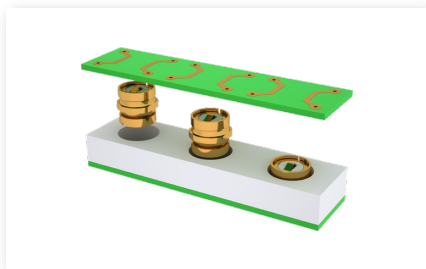
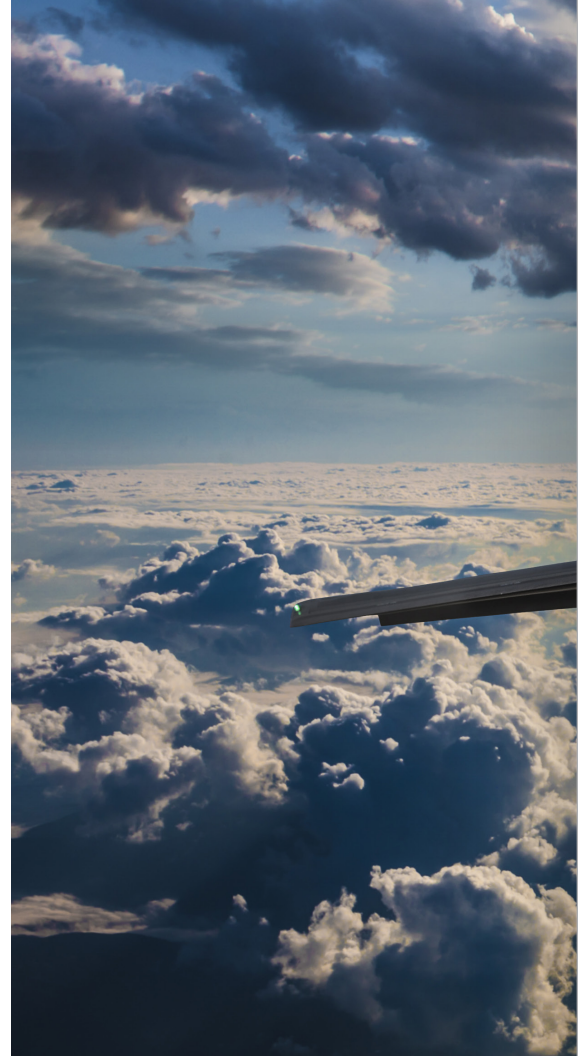
### Q-MTITAN™ ARINC 846

Q-MTitan™ ARINC 846 is the connectivity solution for applications requiring high density, high data rates and reliability. This ruggedized optical contact is qualified in various multipin connectors with a size #8 quadrax cavity to maintain excellent optical performance even in harsh environments.

- Compatible with a variety of multipin connectors
- High density: 12 optical channels in 1 single optical contact

# AIRBORNE MULTI-MISSION

*Radiall's outstanding portfolio matches the complete end-to-end connectivity needs inside the latest generation fighters, which require low-profile solderless RF antenna connectors. Fast, digital and ruggedized optical interconnect solutions are used to link the payload to embedded computers. Ruggedized multipin solutions satisfy avionic system requirements.*



## IMP LOW PROFILE

IMP-LP provides a low profile solderless Board-to-Board solution. Its design uses a cold interposer/holder, allowing for high density and cost-effective integration with high RF performance.

- High frequency: 18 GHz
- Axial tolerance: 0.18 mm
- Board-to-Board distance:
  - IMP-LP "Single": 1.41 mm
  - IMP-LP "Double": 2.85 mm
- Diameter: 3.90 mm



## RF HERMETIC CONNECTORS

Hermetic connectors are used for applications requiring an extremely rugged and reliable seal in high-pressure environmental conditions. They are designed with a fused glass-to-metal seal, which is soldered into the connector body and seals the connector internally.

- Available interfaces: BMA, SMA, SMP, SMPM
- Leak rate less than  $10^{-8}$  cc/sec of helium at 1 atmospheric differential pressure



## RF COUPLERS

Radiall offers a comprehensive range of microwave couplers from 150 MHz to 18 GHz. It includes 3dB Hybrid 90° and directional couplers, octave bands and wide bands. The offer is equipped with SMA and N connectors and is compliant with MIL-STD-202 environmental testing (MIL grade).

- 150 MHz up to 18 GHz
- Octave band and wide band
- SMA and N female connectors, but custom design available
- Excellent directivity and isolation





### D-LIGHT TRANSCEIVER

Radiall's range of D-Lightsys® multi-channel transceivers offers high data rate, smart optoelectronic devices with a very small form factor. Flying since 2007, D-Lightsys® transceivers utilize proven technology. A full range configuration is available, from 1 to 12 channels, all complying with low consumption working mode.

- Up to 12 Gbps per channel
- Proven technology
- Small footprint
- Low consumption
- Qualified for harsh environments



### EB-LUXCIS®

EB-LuxCis® is the ideal solution for demanding applications in highly-contaminated environments. This product range combines the benefit of the LuxCis® ARINC 801 contact and Expanded Beam technology for commonly-used multipin connectors and is compatible with multi-mode and single-mode fiber.

- Easy cleaning and resistance to shock and vibration
- Increased product life span with up to 500 mating cycles
- Product range available: MIL-DTL-38999, EN4165



### MPX

Qualified according to MIL-DTL-83527B specification and to EN3682 European standards, Radiall's MPX series brings together high density and robustness to meet the military aerospace market's needs when harsh environmental conditions are a concern.

- Temperature range: 65 °C (-85 °F) to +150 °C (+302 °F)
- Random vibration: see MIL-DTL-83527B
- Salt spray (test procedure 26 of EIA364): 500 hours

# AIRBORNE SURVEILLANCE

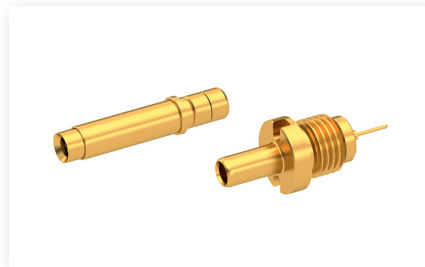
*Airspace surveillance and observation require numerous payloads, sensors and real-time processing capabilities. Radial produces antenna probe-to-RF module interconnect solutions, end-to-end optical data over fiber and multipin packaging to meet MIL-AERO requirements.*



## SHF C/A FOR ALTITUDE IMMERSION

The SHF cable assembly for airborne military applications in non-protected areas has been developed so that RF performance, mechanical robustness and sealing are of the utmost importance. SHF AirFrame cables are also fluid resistant (Skydrol).

- Hermetically-sealed cable assemblies
- Accurate phase matching
- FAR 25, RTCA DO160 qualified



## MCC #12

Radial designed contact size #12 (MCC#12) to achieve high RF performances, robust and reliable mechanical properties and to bypass SMPM's inherent weaknesses. MCC#12 provides an answer to applications that work up to Ka band and require high density. MCC#12 is compatible with 38999 and EPX multi-contact solutions.

- Frequency range: DC to 40 GHz
- Low compression force: 7 to 9 N
- Axial misalignment: 0/+2 mm
- Radial misalignment:  $\pm 0.1$  mm
- Available with high performance SHF cable



## EPXB2 BULKHEAD RECEPTACLE

The new bulkhead technology ensures permanent sealing when installed on a disconnect panel or output between two zones with different environmental conditions.

- Modular design: mateable with any EPXB2 plugs
- Optimized design: no change in wiring process
- Mature design: qualification according to EN4644

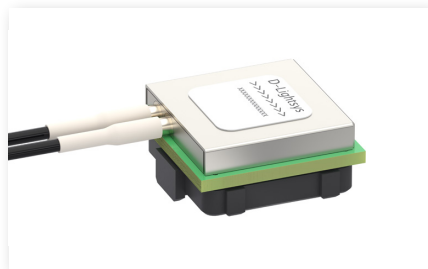




### DSX

With numerous configurations and a wide variety of contacts and accessories, the DSX series offers a robust and high performance solution. Fully intermateable with ARINC 404 type B and SAE AS81659 plugs, they offer the same characteristics as SAE AS81659 connectors.

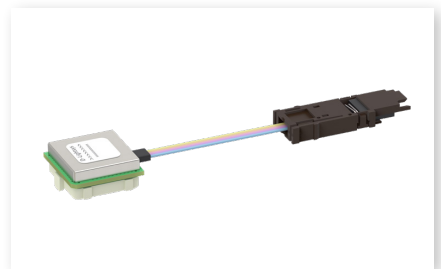
- Durability: 500 mating and unmating cycles
- Temperature range: -65 °C / +125 °C
- Altitude moisture injection: insulation resistance > 100 MΩ altitude 50,000 feet



### S-LIGHT

Radiall's D-Lightsys® single-channel transceiver range offers high data rate, smart optoelectronic devices with a very small form factor. Flying since 2007, S-Light transceivers utilize proven technology. Providing 1 to 2 channels, this range can be equipped with LuxCis® contacts for demanding applications.

- Up to 12 Gbps per channel
- Proven technology
- Small footprint
- Low consumption
- Qualified for harsh environments



### C-MTITAN™ & D-LIGHT

C-MTITAN™ provides a disconnect solution for D-Lightsys® multi-channel transceivers to fulfill high-speed data communication requirements.

- High-density optical contacts (12 or 24 fibers) for inside-the-box applications
- Protection of MT ferrule to withstand high temperatures (-55/+105 °C) and vibration levels (35 Grms)
- Tool-less solution with latching system for easy insertion and extraction

# NAVAL

*Radiall RF cable and connectors, optical interconnect solutions and microwave devices are the perfect solution for electronic warfare and radar payloads installed on board.*



## WILDCAT FMC BOARD

Expand the I/O capabilities of your FPGA board with high-speed and high-density optical links without redesign. The Techway WildcatFMC board provides all the benefits of D-Lightsys® transceivers on a VITA FMC compliant plug-in device.

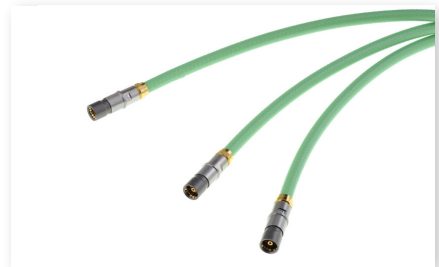
- Optical upgrade on legacy system
- VITA 57.1 and 57.4 compliant
- Up to 24 optical links - 12 Gbps



## LUXCIS® ARINC 801 HARNESS

Radiall's value-added optical assemblies meet the connectivity challenges of the most demanding environments. Our wide range of MIL-DTL-38999 connectors with LuxCis® ARINC 801 fiber optic contacts offers a ruggedized interconnect solution.

- From design to delivery of high-end optical systems
- Complete ruggedized product range, including MIL-AERO grade optical cables and connectors (-55 °C/+125 °C, Vib 43 Grms)
- Hybrid and hermetic harnesses available



## BMA CONNECTORS

Radiall's BMA features high performance and reliability for blind mate applications including radar and airborne systems and can be integrated inside a size #8 cavity in 38999 and rectangular multipin connectors.

- High frequency: 22 GHz
- RF leakage: -90 dB
- Durability: 1,000 cycles min





### OUTDOOR LOW LOSS CABLES

Radiall has developed an innovative range of specific cables dedicated to outdoor applications. Designed to be used in demanding environments requiring high performance, Radiall's outdoor cables meet the needs of naval systems.

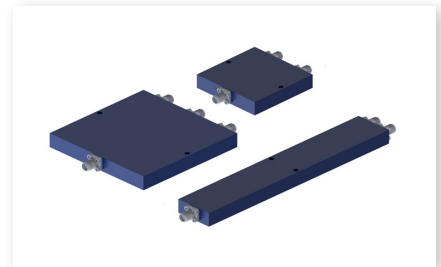
- Typical applications: antenna feeder and radar system
- Available connectors: SMA family, TNC 18, N18
- Low Smoke Zero Halogen (LSZH) grade available



### ATTENUATORS

Radiall offers a wide range of attenuators from DC to 50 GHz, equipped with BNC, SMA, SMA 2.9, SMA 2.4 and other connector series up to 100 W.

- Compatible with many connectors (BNC, TNC, SMA, SMA 3.5, SMA 2.9, SMA 2.4)
- Frequency from DC to 50 GHz
- Power up to 100 W
- Qualified for harsh environments per MIL-DTL-39030



### RF POWER DIVIDERS

Radiall's new range of power dividers combines mechanical robustness and high electrical performance up to 26.5 GHz.

- Comprehensive offer from 0.22 GHz to 26.5 GHz
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- High RF performance, robust design, compliant with MIL-STD-202G
- Wilkinson design: can be used as power combiner





*Compliant with European  
export control regulations  
and United States ITAR.*





# 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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## GLOBAL PRESENCE

*Australia · Austria · Belgium · Brazil · Czech Republic · Denmark · Estonia · Greece · Hungary · Indonesia · Israel · Korea · Latvia · Lithuania  
Malaysia · Norway · Philippines · Poland · Portugal · Russia · Singapore · South Africa · Spain · Switzerland · Taiwan · Thailand · Turkey · Vietnam*