

The new wave in
broadcast solutions



RADIO FREQUENCY SYSTEMS
The Clear Choice®



 Radio Frequency Systems

> Welcome to Radio Frequency Systems

The new wave in broadcast solutions

Great leaders always look to the future. It's their vision that sets them apart, keeps them one step ahead and helps pioneer new innovations others seek to follow. We call this the new wave. And it's the same principle that drives us to be global leaders in wireless broadcast infrastructure.

The new wave anticipates the evolving technology needs of our partners through a higher level of quality and performance in everything we do.

The new wave creates greater connectivity within the markets we serve - OEMs, distributors, system integrators, operators and installers in the broadcast, HF and defense markets.

Radio Frequency Systems (RFS) is located on six continents, with manufacturing centers-of-excellence in Germany, US, Brazil, China and Australia; and technical support and sales offices all around the world in over 30 locations.

The new wave represents one simple force – the design, manufacture and global deployment of RF technology, systems and services. We are committed to meeting the highest quality standards for products and systems by applying advanced technologies to design, engineering and manufacturing.

The new wave is the leading edge to deliver better performance for your business.



> Performance that's future proof

Radio Frequency Systems is committed to developing cutting-edge, highly cost-effective broadcast solutions designed to outlast other systems while never compromising on performance. Here's how we do it:

The only end-to-end broadcast system provider

RFS is the only provider with a truly holistic end-to-end approach. Our focus is on your future needs, so innovation in adaptability of infrastructure plays a vital role.

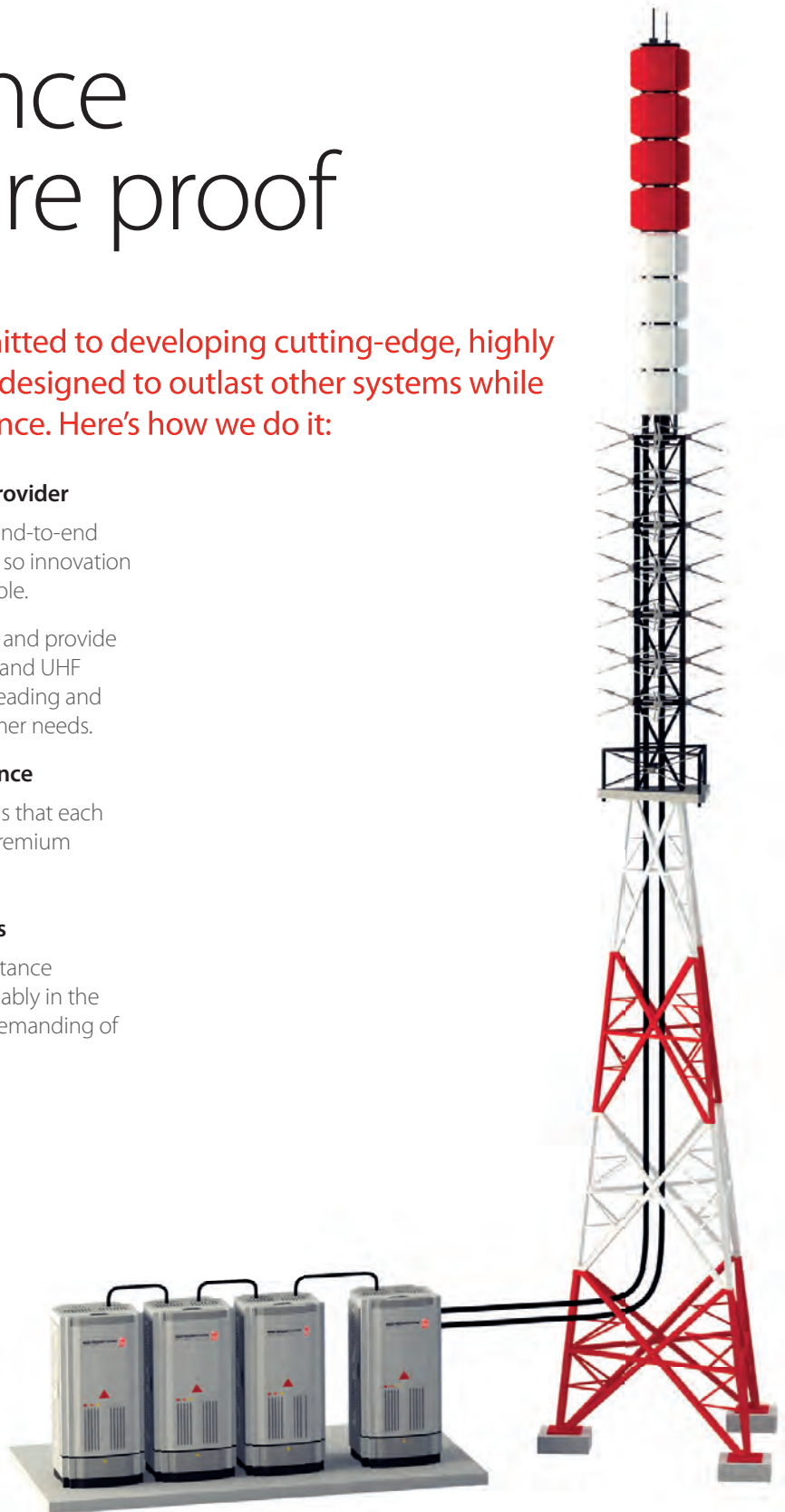
We utilize retunable filters at all power levels and provide the broadest band antennas across FM, VHF and UHF bands. Our polarization designs are market leading and our software tools allow for tuning to customer needs.

A lifetime of superior electrical performance

Meticulous end-to-end system design means that each broadcast system is finely tuned to deliver premium performance, year after year.

Built tough to survive extreme conditions

Our rugged construction and corrosion resistance measures ensure that each system works reliably in the harshest of environments, under the most demanding of operating conditions.



> A new wave in TV and Radio solutions

Because no two networks are the same, Radio Frequency Systems is primed and ready to provide the widest possible range of options for you

RFS is the market leader when it comes to end-to-end broadcast solutions, providing all of the RF systems from the output of the transmitter, all the way up to antennas. This provides a single point of accountability with a fully integrated solution and a complete system warranty.

Our comprehensive range of antenna systems

We offer a vast portfolio of premium performance antenna solutions for television, radio and HF.

Broadband panel arrays

With all polarization options available, RFS broadband panel arrays support Bands I, II (87.5-108MHz), III (174-240MHz), IV and V (470-860MHz). Each array can be tailored for specific coverage and power-handling capability.

Top mount antennas

We offer a range of lightweight and low profile antennas (including slot, dipole, collinear and super turnstile) that support single or multi-channel services.

Side mount antennas

Providing a range of polarization and power options, RFS' side mount antennas are a flexible alternative for television and radio applications.

Whichever broadcast band is in use for fixed television or radio broadcast, we're fully conversant with all global broadcasting standards and emerging digital technologies, including:

Television (analog and digital) – DVB-T, ATSC, ISDB-T, DMB-T/H, PAL, NTSC, etc.

Radio (analog and digital) – FM, DAB, DAB+, HD Radio

HELIFLEX® – the original and still the best

Our world-renowned HELIFLEX® air-dielectric coaxial transmission line is installed easily and quickly, providing maximum strength and flexibility.

HELIFLEX® supports all analog and digital television and radio, and is available in a wide range of sizes (3/8-inch to 9-inch diameter).

HELIFLEX®'s electrical performance is unsurpassed, delivering consistently low VSWR across the entire broadcast band, and low attenuation performance. It is also one of the few flexible feeder cables that can support the high-power requirements of multiple broadcast services.



> A new wave in broadcast

Versatile combiner systems

When it comes to radio frequency combining and filtering technologies, we consider ourselves pioneers. With solutions for the widest range of applications in all television and radio broadcast bands, you can be certain of the quality – we've even been awarded with a prestigious Emmy.

Combining systems encompass a range of balanced, starpoint (branched), commutating line and manifold combiners – depending on the frequency spacing and required performance.

Coaxial filter technology

Our coaxial filters, the primary component of VHF and UHF combiners, are available with two, three, four, five, six or seven poles, depending on the level of filtering required. Additionally, six, eight, ten or twelve-pole cross-coupled filters are also available. Now featuring PeakPower⁺™ technology.

Directional waveguide technology

For high-power UHF combining applications, our unique directional waveguide combiners offer superior performance, in the smallest foot print.

Real-time, addressable RF switching and monitoring systems

We can provide tailored switch frames for broadcast switching applications.

A key element is our unique RFS Rapid Release U-Link system – a scalable system that allows switching to be completed in seconds.

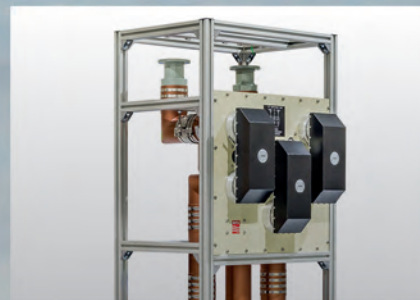
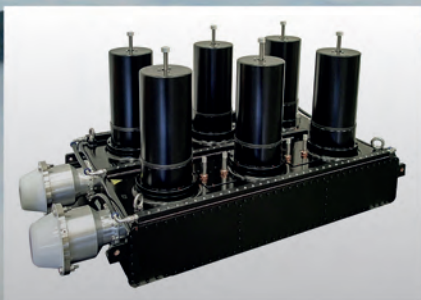
An optional feature is a digital RF monitoring system that provides an active mimic display of the U-Link configuration, and allows digital monitoring of output coaxial equipment parameters (such as power and VSWR).

Simplifying system integration

RFS designed switch frames are engineered and manufactured to provide customers with the ability to make configuration changes. Antennas, combiners and feed systems can be quickly and safely switched in and out of service for maintenance, reconfiguration or emergency conditions.

Premium ancillary hardware

We offer a complete range of premium ancillary components, including rigid coaxial transmission lines, mounting hardware, pressurization equipment and accessories.



> Case studies

Australia

Radio Frequency Systems recently teamed with Broadcast Australia to successfully implement the new wave in the Australian evolution of DTV.

The national restacking plan facilitated clearing all TV channels above 694MHz, and was completed in record time. By the end of the project, RFS had supplied over 280 combiner systems, 70 new antennas and totally replaced transmission infrastructure at 423 sites – all within a tight 18-month timeframe.

This deadline could be met only by replacing complete combiner systems. The fact that RFS broadband antennas were already installed during early digital migration meant they were restack ready, so where VHF moved to UHF, we had previously supplied the right antenna to ensure quality performance.

This remarkable achievement is testament to the hard work and dedication of the Broadcast Australia Project team and RFS.

Philippines

As the digital switchover speeds up in the Philippines, our expertise is not only helping make the switch seamless, we are also providing innovative solutions to significantly reduce costs.

We're supplying ABS-CBN with tailored antenna solutions that include supply, installation and commissioning of the VHF Ch3 system. Starting with the new Baguio tower in the north, four more like it will be installed in 2015.

With two broadband antennas installed on the common spine, the 14-bay column was fitted with customized, streamlined-profile UHF panels which reduced the wind load of the cantilevered structure by up to 40%.

By incorporating this feature into the tower design calculations resulted in significant cost reduction, and will form the basis of the four new structures as we complete the project.



USA

We're taking our expertise to record heights! Standing at 1,776 feet, the antenna support of the One World Trade Center building makes it the tallest building in the Western world. It's the ideal platform to deliver terrestrial TV services to the entire New York City coverage area – and show the quality and performance RFS can deliver.

Whilst we've previously provided passive digital antenna system equipment, this project represents new challenges as we work on the installation of the PEP antenna arrays. These feature Variable Polarization Technology (VPT) which allow each broadcaster to define its own polarization ratio.

Other manufacturers could only envisage fixed polarization that must be agreed upon by all broadcasters using a common antenna. Our solution offers the flexibility to all broadcasters making it virtually future-proof.

Currently we have installed our PEP8A (a single face UHF array of eight levels) and below that is the VHF 662-4A. Both test antennas are required to prove the vertical radiation patterns and system performance before a final configuration is decided.

> Radio Frequency Systems global services

Broadcast system services for a Total Package Solution

Radio Frequency Systems' end-to-end broadcast system solutions are not limited to equipment alone; they include a host of additional services that make or break a successful installation.

Radio Frequency Systems broadcast services include:

Site survey

Assessing existing infrastructure and coverage requirements.

Field strength mapping

Using sophisticated software packages.

System design

Tailoring for specific site, performance and coverage requirements.

Manufacturing

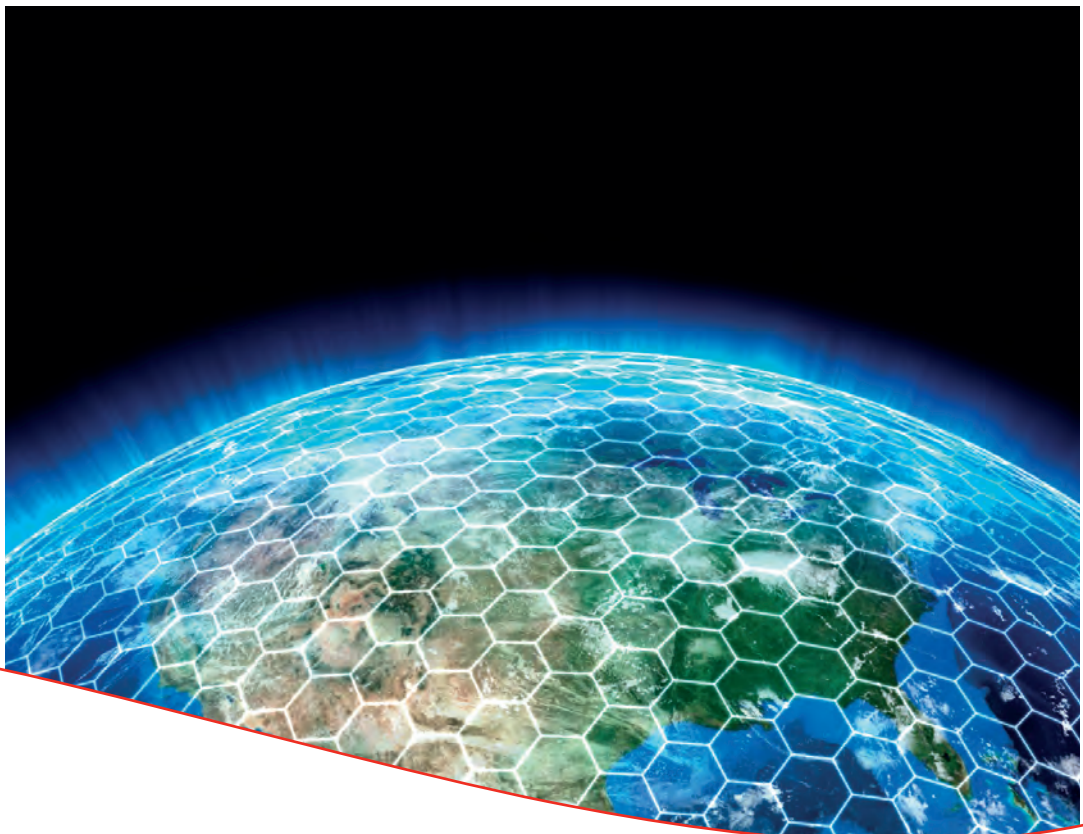
Leveraging state-of-the-art manufacturing facilities.

Project management

Ensuring projects progress smoothly.

Installation and commissioning

Taking responsibility for system optimization and deployment.





36 Garden Street
Kilsyth, Victoria 3137, Australia
Tel: +61 3 9751 8400

Rua Marcelino Pinto Teixeira, 481
CEP 06816-000 Embu - Sao Paulo, Brazil
Tel: +55 11 4785 6000

299 Rongle Road(E), Songjiang
201613, Shanghai, P.R. China
Tel: +86 21 3773 8888

Centre de Villarceaux, Route de Villejust
Bâtiment Newton E, 91620 Nozay, France
Tel: +33 (0) 2 40 45 95 45

Kabelkamp 20
30179 Hannover, Germany
Tel: +49 511 676 2000

200 Pondview Drive
Meriden, Connecticut 06450, USA
Tel: +1 203 630 3311

RADIO FREQUENCY SYSTEMS
The Clear Choice®



www.rfsworld.com

The new wave in broadcast solutions

Antennas



Performance excellence

Our infrastructure sharing technologies, and patented variable polarization antenna design guarantees predictable pattern coverage and electrical performance, ensuring the highest quality now and into the future.

Radio Frequency Systems (RFS) uses “best-in-class” technical expertise and state-of-the-art tools to produce top and side mount antennas for any support structure, pattern coverage for any geography and any power (watts to Megawatts).

End-to-end solutions for every site: single channel and multiple station operation, analog and digital, all global TV and radio broadcasting standards.

RFS produces high quality antennas that deliver value for money.

Easy to install and having limited maintenance requirements, RFS provides product support with every antenna.

Consistent electrical and mechanical results that outperform the competition

Broadband panel arrays

All polarization options available, RFS broadband panel arrays support Bands I, II (87.5-108MHz), III (174-240MHz), IV and V (470-860MHz). Each array can be tailored for specific coverage and power-handling capability.

Top mount antennas

We offer a range of lightweight and low profile (including slot, dipole, collinear and super turnstile antennas).

Side mount antennas

In a range of polarization and power options, RFS’ side mount antennas are a flexible alternative for television and radio applications.

Iconic RFS panel arrays and cylindrical antennas grace skylines around the world.

Whether your site is high altitude or below sea level, in hot desert, surrounded by tropical rainforest, or located on an island, antenna design that accommodates the most demanding broadcast restrictions to neighbouring sites is the RFS stock-in-trade.

RFS capability offers the best technical solution and delivers the best quality manufactured product on the market.



> Why RFS

Product	Best-in-class technical performance	Future proof	Bespoke/ standard designs	Cyclone rated	Low wind load	Rugged construction
VHF TV Band I	✓		✓		✓	✓
VHF FM Radio Band II	✓	✓	✓	✓	✓	✓
VHF TV Band III	✓	✓	✓	✓	✓	✓
UHF Band IV/V	✓	✓	✓	✓	✓	✓

> Case study

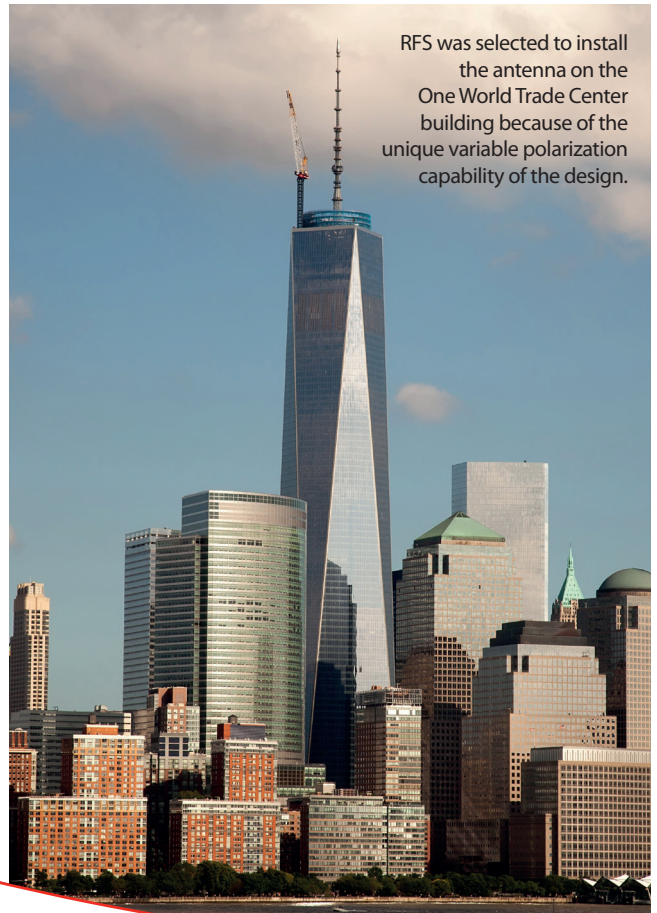
RFS on One World Trade Center

We're taking our expertise to record heights! Standing at 1,776 feet, the antenna support of the One World Trade Center building makes it the tallest building in the Western world. It's the ideal platform to deliver terrestrial TV services to the entire New York City coverage area – and show the quality and performance Radio Frequency Systems (RFS) can deliver.

Whilst we've previously provided passive digital antenna system equipment, this project represents new challenges as we work on the installation of the PEP antenna arrays. These feature Variable Polarization Technology (VPT) which allows each broadcaster to define its own polarization ratio.

Other manufacturers could only envisage fixed polarization that must be agreed upon by all broadcasters using a common antenna. Our solution offers the flexibility to all broadcasters making it virtually future-proof.

Currently we have installed our PEP8A (a single face UHF array of eight levels) and below that is the VHF 662-4A. Both test antennas are required to prove the vertical radiation patterns and system performance before a final configuration is decided.



RFS was selected to install the antenna on the One World Trade Center building because of the unique variable polarization capability of the design.

The new wave in broadcast solutions

Filters & Combiners

Great design delivers outstanding performance

PeakPower™ technology and rigorous product development testing are cornerstones of the Radio Frequency Systems (RFS) filter success story.

Our international team makes it look easy by using advanced technologies in product development. We design elegant, yet complex equipment that is simple to maintain, install and operate.

RFS dominates the competition in filter and combining solutions. Our proprietary technologies are patent protected and we've won many awards for design innovations, such as adjacent channel combining, that have saved the industry millions of dollars.

We are so confident in our filters, that we share our tuning secrets under license to put you in the driving seat when digital repacking comes your way. We stand above the crowd with filters that are fully flexible, and digital ready – this is our future-proof promise.

Use our new generation filters and combiner systems in your next digital project

Coaxial filter technology

- RFS full band tunable filters can be supplied for all broadcast frequencies: Bands II (87.5-108MHz), III (174-240MHz), IV and V (470-860MHz). These are the building blocks of our world-class combining systems.

- There are 2, 3, 4, 5, 6, 7, 8, 10 and 12-pole filters to suit all requirements.

- Modular filter design facilitates combiner system integration in balanced, star point (branched), commutating line or manifold configurations. Systems are expanded easily, and can be supplied with or without frames.

3dB coupler technology

- Flattest response 3dB couplers with superior wideband return loss facilitate fast retuning at site during digital switch over.

High power filter technology

- High power UHF is normally the domain of directional waveguide filters. RFS offers superior performance combining in a compact waveguide footprint. New coaxial filter models greater than 20kW are now available for high power applications and include tunability!

Our products feature the highest input peak power rating available on the market today.

From 50W to 80kW, RFS filters are designed to accept highest input power levels, with lowest insertion loss, and lowest operating temperatures.

At RFS, we take safety seriously, which is why we test to the true limit. RFS filters are fully cost optimised to remove excess materials and time from the production process, saving you money and conserving valuable material resources for future generations.



> Why RFS

Product	PeakPower ⁺ ™ filter technology	Lowest insertion loss	Lowest operating temperature	Smallest footprint/kW	One robust model for all mask standards	BCAT™ compatible
VHF FM Radio Band II/ Multimedia	✓	✓	✓	✓		
VHF FM Radio Band II	✓	✓	✓	✓		
VHF/DAB/ Multimedia	✓	✓	✓	✓		
VHF TV Band III	✓	✓	✓	✓		✓
UHF Band IV/V	✓	✓	✓	✓	✓	✓

> Case study

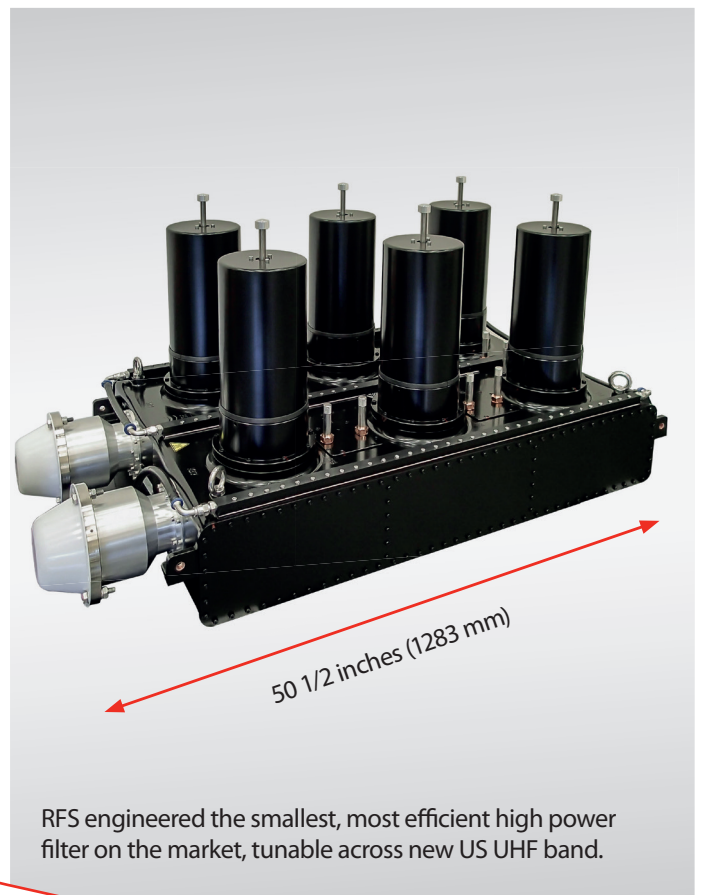
Seriously, the coolest filter ever

When NBC and Rohde & Schwarz needed a high powered but efficient filter for their latest solid-state transmitter they looked to Radio Frequency Systems (RFS), leaders in high-powered filter design. The 6PPXX325E PeakPower⁺™ filter was designed by our engineers to meet new levels of peak power handling in the smallest size filter on the market.

The 325E filter is fully tunable across the recently proposed new US UHF band 470-635MHz and can operate at maximum power levels of 50kW. For the Phoenix site operating at 25kW, water-cooling was not mandatory but was supplied at customer request.

Patents are pending on the innovations in this revolutionary filter which can be installed today on one channel then simply retuned in the future when the US restack program requires, at no additional expense.

RFS' unique BCAT™ software allows customers to easily and quickly retune any of the PeakPower⁺™ range of filters without changing any hardware.



The new wave in broadcast solutions

Switch Frames

Stylish appearance, spectacular performance

Imagination, application, persistence: key qualities that result in excellent Radio Frequency Systems (RFS) products. Custom or standard, RFS switch frames are functional and cost-effective. We work with you to realise your project.

Switch frames are the heart of integrated systems, joining antennas, combiners and transmitters in many configurations.

RFS has solutions for radio and television services in all bands, all port configurations, with or without loads, using couplers or splitters, incorporating mechanical and/or electrical switching, and power monitoring to meet any scenario, for any broadcast standard.

Elegant lines of RFS switch frames hide complicated wiring. Sleek RFS front panels feature U-links in compact arrangement; the mechanisms have smooth action.

Manual U-link sizes range from 7-16 DIN to 7-3/16" EIA. Above 1-5/8" our U-links

Make RFS switch frames the heart of your integrated transmission system

incorporate a quick release mechanism that ensures complete disconnection of interlocks before RF disconnection commences.

This improves operator safety, while the mechanically aided RF connect/disconnect feature facilitates easier removal of the U-link. Changeover is minimised to just a few seconds.

Ten reasons to choose RFS switch frames:

Maximum safety. Interlock circuits on rapid release U-links are opened before the U-link is moved.

Simple, smooth operation. U-links are easy to remove, making changeover during an emergency quick and simple.

Excellent electrical characteristics. Low insertion loss and low VSWR across the full frequency range is the best available.

Stable performance. Rugged construction means the U-links will operate for many years without failure.

Fully tested. RFS design engineers test U-links under full power to guarantee performance.

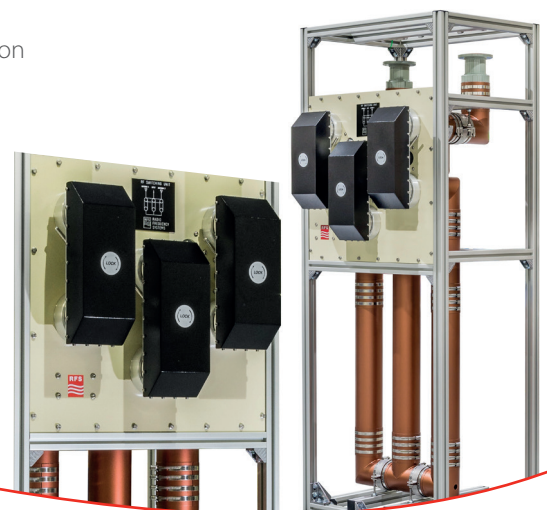
Proven reliability. RFS rapid release U-links have been operating in systems around the world for more than 20 years.

Customised solutions. Want to make use of an old transmitter as a back-up? Need a more compact rack? Talk to RFS about a special configuration to suit your needs.

Power monitoring. Include the most accurate digital power meters available or choose the RFS MSV2 monitoring system with real time mimic panel, remote monitoring via ethernet, SNMP, and monitoring of up to 200 detectors.

Integrated solutions. Only RFS offers all passive equipment from the transmitter output to the antenna. RFS will take care of all interface issues.

Global reach. The RFS group of companies has factories and offices to cover all populated areas of the planet. Whatever support you need is never far away.



> Why RFS

Features			
Manual U-links or motorised coaxial switching	✓	Can be integrated into channel combiner systems	✓
U-links rapid release 1-5/8" to 7-3/16" (manual release 7-16 DIN and 7/8")	✓	Panel mounted motorised coaxial switches for 1-5/8" and 3-1/8"	✓
Simple, compact, basic configurations for cost-effective solutions	✓	Custom configurations for special requirements	✓
High accuracy power meters and system monitoring systems	✓	Flexible adaptor system interfaces with any RF equipment	✓

> Case study

MMBI – a new wave in Japan

Digital VHF is rare outside Australia but the Japanese are looking to the future with data streaming to portable terminals and clever roaming technologies.

This system is called MMBI using ISDB-T, the Japanese standard for digital broadcasting based on an OFDM (orthogonal frequency-division multiplexing) modulation. The signal covers 14 MHz bandwidth at VHF for mobile services.

Radio Frequency Systems (RFS) is the original equipment manufacturer (OEM) of 1-5/8" and 3-1/8" switch frames in this developing market. These switch frames have electrically operated coaxial switches and a manual U-link back up to switch either of two transmitters to the antenna or into an internal test load. Forward and reflected directional couplers indicate power levels and VSWR on the inputs and outputs which are connected with RFS's premium copper rigid lines and elbows.

Design of the RFS frame takes into account fitting of additional equipment at another location before the fully specified product is shipped to the end customer.

VHF filters in 60mm, 120mm and 230mm cavities support the mask filtering requirements in this new market.

A successful OEM model requires close collaboration with the end supplier. RFS OEM relationships in Japan are testament to the strength of purpose between organisations evolved over many years, strict observance of design and manufacturing parameters, and a mutual desire for excellence.



Switch frame featuring electrically operated coaxial switch and manual U-link back up for MMBI

The new wave in broadcast solutions

Transmission Line



Performance certainty

At Radio Frequency Systems (RFS), delivering to your requirement is top priority.

RFS transmission line products are made from premium materials and offer low attenuation and high power rating to ensure superior performance of your transmission system or network. Pair with our connectors, trimming tools, lifting stockings and grounding kits to simplify installation for a total RFS solution.

RFS's leadership in the industry has never been in contention. Since 1900, our people have developed transmission line products for every conceivable RF purpose. Founded in Hannover, Germany, RFS is the original manufacturer of electric cable and famed for the insulation technique patented by Louis Hackethal in 1901. Our corrugated coaxial cable, developed in the 1950s, broke new ground for broadcast.

RFS makes the finest RF cable, and offers transmission line solutions with pride. Even our competitors use products manufactured by RFS because we offer the lowest loss components and the highest power ratings. Choose RFS The Clear Choice.™

Leading innovation since 1900

Rigid lines

- Made from high conductivity copper and aluminium prefinished to order. Maximum lengths are 18 feet (5.5 meters).
- For external use, painted copper ensures longevity and increases power rating.
- Fully welded flanges are pressure tested for pressurized systems.
- Elbows with captive inners, tees, adaptors, straight couplings, inner joiners, all-thread suspension hangers for the full range.
- Unflanged rigid line for in-building application can be coated to maintain appearance.
- Tunable aluminium elbows now available for 1-5/8", 3-1/8" and 4-7/8" systems.



Cables

- RFS flagship coaxial cables are sold under the HELIFLEX® and CELLFLEX® brands. Standard cables have air dielectric, while low loss, superflexible, ultraflexible and braided cables have foam dielectric.
- Characteristic impedance is 50 ohm.
- Each cable run is tested. The jacket shows sequential marking for length, product code and production tracer code. Cables can be terminated if required. Records of the electrical performance can be supplied.

Connectors

- Contact parts are silver plated and available to fit all RFS-manufactured cable sizes and types.

Installation accessories

- RFS offers all the tools and accessories for a complete system.



> Why RFS

Features			
Highest power, lowest loss for products of equivalent size from any competitor	✓	Superior performing terminations	✓
Custom lengths and interfaces	✓	Flexible adaptor system interfaces with any RF equipment	✓
Rigid lines 7/8" to 9-3/16" 7-3/16" and above in 75 ohm	✓	Full range of accessories	✓
Air dielectric cables 3/8" to 9"	✓	Foam dielectric cables 1/4" to 2-1/4"	✓
Wideband elbows	✓	50 ohm to 75 ohm transformation	✓

> Case study

Superior signal with 9-inch diameter cable

The largest aluminium air dielectric cable in the world is produced by Radio Frequency Systems (RFS) for HF, MF, shortwave and VHF broadcast applications up to 590MHz. Rated for 5.8MW at 1MHz and 1MW at 40 MHz, this cable ensures clarity of sound.

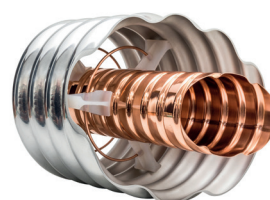
Relay stations A'Seela Station, Oman and Nakhon Sawan, Thailand, broadcast to the most populous places on earth and were upgraded for the BBC World Service in 2001 using HELIFLEX® 9-inch cable. The turnkey solution included site survey, design, layout and acceptance testing of 2460 feet (750 meters) of cable linking three 250 kW transmitters to five shortwave curtain arrays (high gain directional antennas designed for long-range) and one rotator curtain antenna. In Thailand 360 feet (110 meters) of cable feed two new shortwave antennas.

Delivered on reels, 9-inch cable has a minimum bending radius of 67 inches (1.7 meters). It makes an impressive sight. One German customer has received 33 miles (50 kilometers) while smaller volumes are installed in Kuwait, the Netherlands, French Guyana, and the Seychelles.

Corrugated aluminium outer conductor is welded around a copper inner, held in place with Teflon™ spacers. The HELIFLEX® coaxial cable outer creates a continuous RFI/EMI shield to minimise system interference. Due to low attenuation, outstanding heat transfer properties and temperature-stabilized dielectric materials, HELIFLEX® cable provides safe, long-term operating life at high transmit power levels.



RFS 9-inch cable installed for BBC World Service in Thailand



The new wave in HF solutions

Antennas



Safe and secure Dependable performance

Defense projects mature over a long time. Mobilizing world class communications capabilities for more than 30 years in high frequency (HF), Radio Frequency Systems (RFS) demonstrates its credentials time and again – we are in this market for the long haul.

At the leading edge in supply of HF and defense materiel, RFS has internationally recognized innovative designs, first-world manufacturing and highly experienced installation teams boasting a role in the implementation of high profile HF antenna systems for defense organizations and governments around the world.

Communications systems and transportable antennas for emergency agencies such as rural fire authorities and ambulance services are available too.

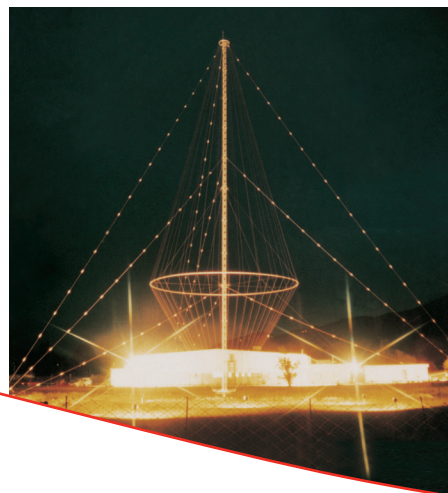
RFS broadband HF antennas suit a wide range of applications: from simple, low-cost SSB installations, long lead-time, complex military installations, to electronic warfare countermeasure systems.

Tactical and strategic products backed by exceptional design and implementation services

The portfolio contains products for short, medium and long-distance broad area coverage, ionospheric propagation and shore-ship/ship-shore/ground-air communications, plus tactical man pack, transportable and fixed antennas for omni-directional, directional and beam steering applications.

Highly qualified teams of RFS engineers use cutting edge technologies and a continuous program of research to produce custom and standard designs.

The list of high profile defense projects from RFS includes the Jindalee Operational Radar Network (JORN), an over-the-horizon radar, HF Modernization, Grail, and Nullarbor. Our tactical antennas are used by UN Peacekeeping forces and our radars by the French military. We have antennas on every continent.



Product overview

- Strategic and tactical HF antennas fully tailored to your requirements.
- Medium to long-distance broadband monopoles offer omni-directional, low angle radiation patterns for general HF communication.
- For medium to long-distance applications, horizontal log periodic antenna performance is virtually ground independent with take-off angles tailored to requirements.
The vertical log periodic antenna series provides ground dependent vertical beam widths, characterised by a low angle radiation that is constant at all frequencies.
- High performance directional rotatable log periodic antennas exhibit high gain, coupled with excellent rotation speed and accuracy making these antennas ideal for multi-link applications with short, medium and long-range coverage.
- Biconical dipoles are omni-directional and broadband, designed for short and medium-range coverage.
- Standard and tandem delta antennas (travelling wave technology) for ionospheric propagation over short-to-medium distances.
- Compact, low VSWR, high isolation, RFS antenna-switching matrices facilitate multiple transmitter/receiver to multiple antenna interconnections.

> Why RFS

Product	Broadband	Rugged Construction (15 year life)	High Efficiency	Low Maintenance	Cyclone Rated
Tactical antennas	✓	✓	✓	✓	
Broadband monopoles	✓	✓	✓	✓	
Horizontal and vertical log periodics	✓	✓	✓	✓	✓
Rotatable log periodics	✓	✓	✓	✓	✓
Biconical dipoles	✓	✓	✓	✓	✓
Standard and tandem deltas	✓	✓	✓	✓	
HF shortwave antennas	✓	✓	✓	✓	

> Case study

A trusted partner

The Jindalee Operational Radar Network (JORN) is an HF skywave radar system providing surveillance over an area of approximately 20 million square kilometers (nearly 8 million square miles). The largest project of its kind in the world, the JORN installation provides a powerful surveillance facility using advanced over-the-horizon radar (OTHR) technology – a technique which extends conventional radar range some thousands of kilometers beyond line-of-sight.

Radio Frequency Systems (RFS) has been pivotal to the successful development, design and installation of the world's largest, high precision HF transmit and receive antenna arrays. The massive US\$24 million antenna arrays have been entirely designed, built, installed and commissioned by RFS. It represents a major technological leap forward for global antenna development.

