



ADVANCE

with **RFS Antennas**

RFS BASE STATION ANTENNAS

Your Strategic Partner for High-Performance Solutions



ADVANCE





With Radio Frequency Systems

A Proven Leader in Base Station Antenna Design and Manufacturing

RFS is at the forefront of providing the highest quality antennas as part of end-to-end solutions to support wireless operators in keeping up with rapidly evolving industry standards. For more than sixty years, RFS has been producing innovative, high-gain base station antennas. From 2G and 3G to 4G – and now, beyond – RFS has the design expertise and antenna manufacturing capabilities that many of the world's largest telecom operators rely on for future-proof network deployments.

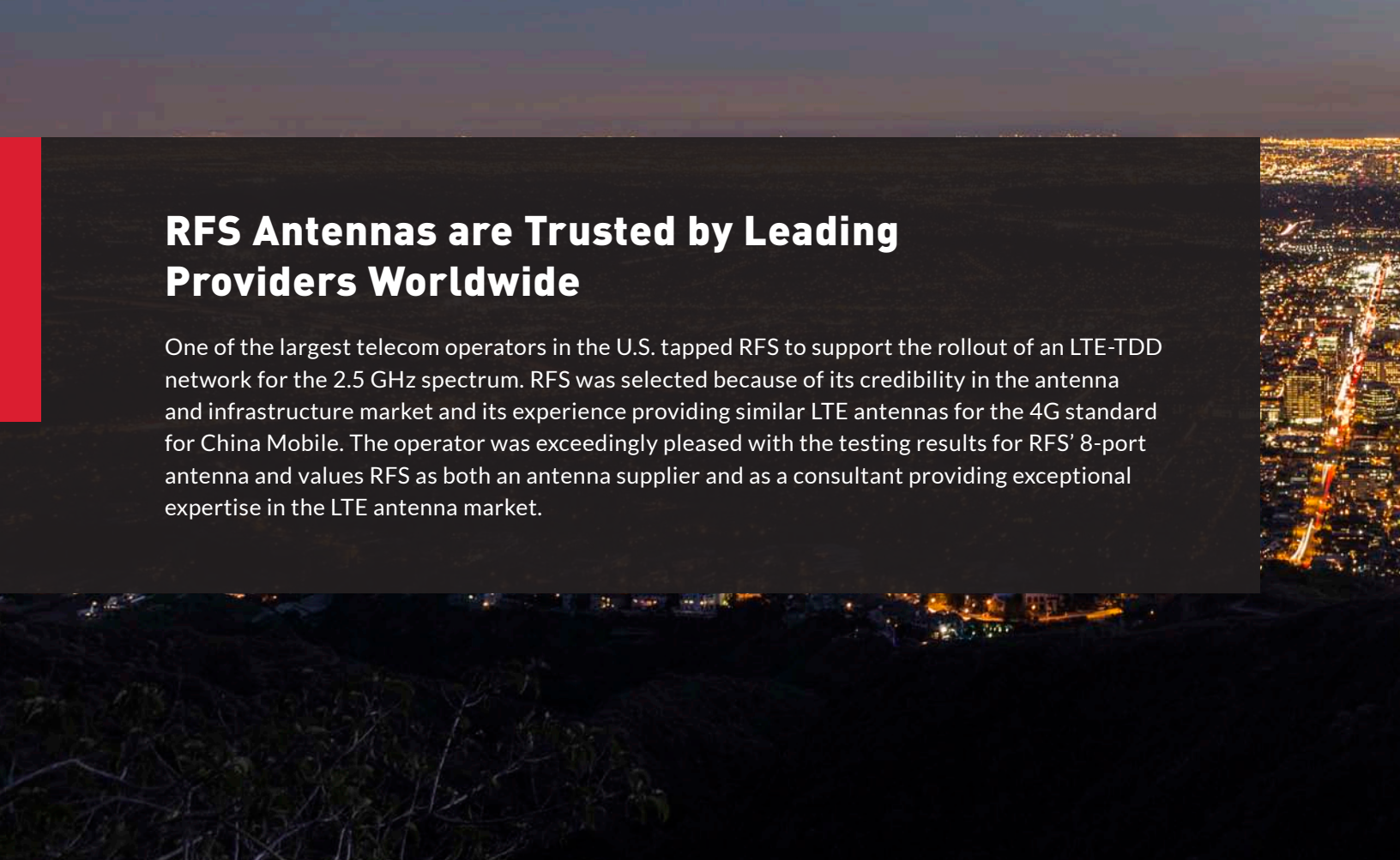
The Next Generation in Antenna Performance

It's never too early to plan for the future; stay ahead of the curve and be prepared for what's coming next with antennas from RFS.

From RFS' popular RF X-TREME™ base station antenna family – a flexible, extendable platform supporting evolving side-by-side antenna configurations – to its visionary transparent antennas, RFS provides the best performance while innovating for the evolving needs and challenges of site operators.

[**www.RFSworld.com**](http://www.RFSworld.com)





RFS Antennas are Trusted by Leading Providers Worldwide

One of the largest telecom operators in the U.S. tapped RFS to support the rollout of an LTE-TDD network for the 2.5 GHz spectrum. RFS was selected because of its credibility in the antenna and infrastructure market and its experience providing similar LTE antennas for the 4G standard for China Mobile. The operator was exceedingly pleased with the testing results for RFS' 8-port antenna and values RFS as both an antenna supplier and as a consultant providing exceptional expertise in the LTE antenna market.

Tomorrow's Antennas, Today

RF X-TREME™ Ultra-Broadband Antennas

RFS' RF X-TREME base station antenna family uniquely provides the capacity of three full-band antennas by placing them side-by-side to achieve high gain and optimal performance in a single package. The innovative antenna design provides the highest gain and cross-polar discrimination combined with the best vertical pattern control of any triple-band antenna of its size in the industry. Using the entire antenna length in most antennas for every band instead of the traditional method of stacking antennas on top of one another means operators can evolve from a dual-band antenna to a triple-band antenna of the same length and maintain similar gain levels on already deployed networks.

Transparent Antennas

RFS' visionary antenna design not only provides the best performance, but in some cases also reduces the difficulty of acquiring new sites and renewing existing leases. With its transparent antenna product line, RFS' R&D team made each element of the antenna transparent before assembly. As opposed to the traditional camouflage approach, RFS' transparent antennas truly have the least visual impact on the environment, blend into the color of the surroundings, can be used on all buildings around the world and are specifically designed to not look like a traditional antenna.



The RFS Advantage

With RFS base station antennas, our customers benefit from:

More bands per antenna – RFS antennas come in tri-, quad-, penta- and hexa-band models

New bands in low frequencies – RFS antennas support frequencies in the 700MHz and will soon support the 600MHz spectrum

New bands in high frequencies – Support for the 3.5GHz spectrum, facilitating acceleration of WiMAX migration to LTE TDD

More throughput – Providing full-band coverage on every port enables operators to implement 4xRx and 4xMIMO on any of the higher frequency bands, enabling excellent cell-edge performance with fewer base stations

System design flexibility – Antennas that cover all mobile services: 2G, 3G and 4G with upgrade path

Decreased tower loading – RFS enables customers to use one antenna instead of four and reuse existing towers without need for reinforcement

“Wind Master” antenna design – Half-cylinder radome shape reduces wind load up to 50 percent compared to competitor offerings



ADVANCE

your infrastructure

Because RF Performance is More Than Crucial, We Design Our Antennas to Meet **YOUR** Challenges

A New Generation of Multi-Band Antennas

Since 2006, RFS has been designing innovative multi-band antennas to accommodate advancing wireless technologies. From WiMAX to TD-LTE – today's key driver for antennas – RFS has multiple generations of multi-band antennas built for the challenges of today and tomorrow.

RFS' RF X-TREME provides optimized gain performance and maximum gain in high band frequencies when propagation is not favorable, enhanced discrimination for MIMO and RX diversity mechanisms. RFS understands as data throughput increases, gain and upper sidelobe suppression matter more than ever.

RFS also offers jumpers and field-installable 4.3-10-style connectors to support its BSA product portfolio, allowing operators to achieve the highest performance with the new 4.3-10 interface standard.

Critical Considerations for Performance

- **Isolation** – Isolation is part of design optimization during the product development cycle.
- **Gain and cross-pol discrimination** – Gain is the first criteria for cell site planning. RF X-TREME platforms are especially designed for maximum gain and enhanced cross-pol discrimination thanks to its unique side-by-side architecture.
- **Squint** – RFS minimizes squint across the full frequency band and tilt range.
- **Upper Sidelobe (USL) suppression** – Upper sidelobe (USL) is the main contributor to interference which limits capacity of ALL cellular networks; USL suppression is crucial.



The Importance of Passive InterModulation (PIM)

PIM is a major concern for every engineer, technician and site installer because it can cause a major adverse effect on the quality and performance of a typical communications site. Good site design, good installation practices and good site maintenance can keep PIM from becoming a major problem affecting everyone.

In antennas, PIM can be caused by many things, such as poor solder joints, loose connections, dissimilar metal junctions, too many contact points and oxidization between metal surfaces that are in contact with each other.

Before every product launch or product re-design, RFS carefully considers PIM with regard to each of the following processes:

Product or System Design – The careful selection of materials, such as avoiding any alloys containing iron, is a primary concern, as are the circuit layouts themselves. Simplified designs help limit possible PIM generators.

Manufacturing Process – Maintaining a clean production environment is a key contributor to producing products with good PIM performance. For this reason, the RFS production facilities are environmentally controlled and meticulously cleaned. Extensive processes are also in place to keep both raw materials and equipment as clean as possible to avoid adding any contaminants, which could cause PIM, into products.

PIM Tested – 100% of RFS's base station antennas are dynamically tested for PIM.

Testing Prior to Shipment – Although the test processes differ from product to product, PIM testing is conducted on a large majority of the RFS product portfolio.



Read the RFS PIM White Paper for more information:

Access the document – <http://www.rfsworld.com/white-papers,104,1.html>

A photograph of an antenna mounted on a vertical metal pole inside an anechoic chamber. The walls are covered in dark blue, pyramid-shaped electromagnetic absorbers. A large, stylized white arrow points from the left towards the antenna. The antenna itself is a long, white, rectangular unit with a metal mounting bracket and some wiring at the bottom.

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your **performance**



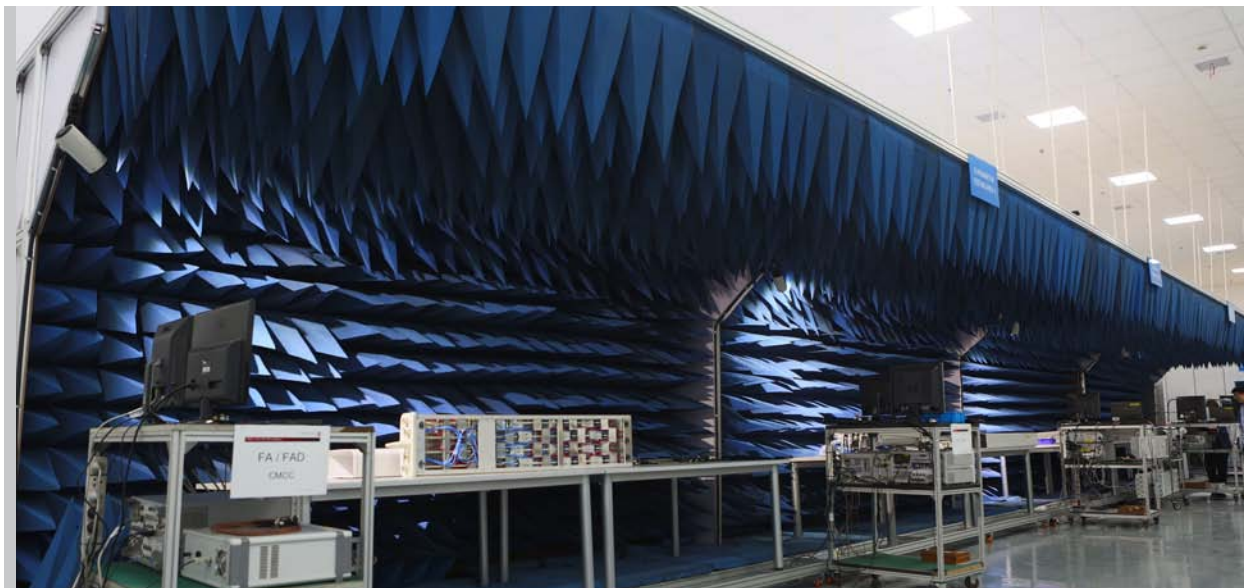
READ MORE: RFS FAR-FIELD TESTING

Access the guide – www.rfsamericas.com/Datasheets/RFS_Far_Field_Antenna_Test_Range.pdf

Rigorous Testing Ensures the Highest Performance

BASTA Compliance

RFS antennas comply with BASTA standards recommended by the Next Generation Mobile Network (NGMN) Alliance for base station antennas. The deployment of BASTA-compliant antennas like RFS' can ultimately result in improved wireless network performance – saving operators time, money and frustration. BASTA values are available on request for all RFS antennas.



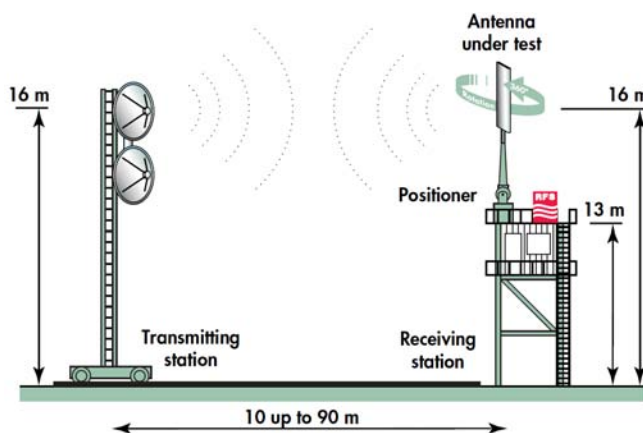
Testing Facilities in France, China and the U.S.

Comprehensive product qualification is the key to success in verifying reliability. With testing and R&D facilities, staff, and teams of designers and research groups in three countries, RFS' BSA antennas are recognized for superior performance and long-lasting quality all around the world.

RFS has outdoor testing facilities in Lannion, France and Meriden, CT and indoor testing facilities in Shanghai, Meriden and Lannion with advanced technology for near and far-field test ranges to re-create the wide variety of outdoor conditions.

RFS performs 100% production testing on:

- VSWR
- Isolation
- Passive Intermodulation (PIM)



We always welcome our customers for a benchmark test using our indoor or outdoor test range!



ADVANCE
your **reliability**

In addition to our robust indoor facilities RFS
also welcomes our customers for benchmark
testing using our **outdoor test range!**



RFS Environmental Test Chamber



RFS Mechanical Vibration Testing Equipment

ETSI 300 019-2 Series Test Specifications

General Specifications for BSA products follow the definition of the ETS 300 019-2 series.

Specification of Environmental Tests for Telecommunications Equipment:

- Operation: ETSI EN 300 019-2-4: Class T4-1 E: Non-Weather Protected Locations – Extended
- Storage: ETS EN 300 019-2-1: Class T1.2: Weather Protected Locations – not temperature controlled
- Transportation: ETS EN 300 019-2-2: Class T2.2: Careful Transportation Class T2.3: Public Transportation
- RFS antennas operate under the environmental conditions defined in ETS 300 019-1-4 class 4.1 E

Main tests are outlined in the ETSI Standard – further specific tests apply to RFS products:

- | | |
|---|-------------------------------|
| • Temperature – IEC 600-68-2-14 Test Nb | • Free Fall – IEC 600-68-2-31 |
| • Dry Heat – IEC 600-68-2-2 Test Bb | • UV test – ISO 4892-2A |
| • Cold – IEC 600-68-2-1 Test Ab | • Wind Load testing |
| • Humidity – IEC 600-68-2-78 Test Cab | • HALT tests |
| • Rain Test – IEC 600-68-2-18 Test Rb | • Climatic Chamber testing |
| • Salt Mist – ISO 9227:2006 | • Free Fall testing |
| • Sinusoidal Vibration – IEC 600-68-2-6 | |
| • Shock & Bump – IEC 600-68-2-29 | |

Antenna System Reliability Testing introduces critical test criterion:

- MOBF (Mean Operations between Failure) and End of Life testing are performed in the full product specified temperature range

Features Overview

RFS has a wide range of Variable and Fixed Tilt Antennas offering a variety of options and benefits:

Fixed Electrical Tilt

- Equal reduction of all interferences
- Regular reduction of coverage
- Better visual impact (typically) due to a shallower radome than wrap-around VETs
- Lighter and less expensive

Variable Electrical Tilt

- Easy cell size tuning according to capacity evolution
- Full network planning freedom
- Keep low interferences
- Prevent change of antenna

RFS' New Slim RET Control Unit

- Uses one motor per antenna array
- AISG 1.1 and 2.0 Compatible
- Has been tested with 30,000+ antenna movements
- Provides more space for connectors and is suitable for slide-in/internal RET solution
- Has been IOT tested with leading equipment suppliers
- Has been pre-commissioned to AISG serialization standards

Manual Overdrive

- Manually adjust electrical downtilt using simple tools in the field
- Streamlines installation and ensures ease-of- use
- No sophisticated tools required; the tool to drive the MOD is a standard 5mm Allen wrench (hex key)

Integrated Bias-T

Combines the DC currents and RF signals onto one transmission path in the antenna; reduces the overall cable and components in the customer's system



Slim RET



Manual Overdrive



Dual Axis Mechanical Tilt Sensor

Mechanical Tilt Sensor

RFS' AISG 2.0-compatible, dual axis Mechanical Tilt Sensor is a simple-to-install in-line device that accurately measures the antenna position in real-time without physically having to check the placement on site.

Benefits of mechanical tilt sensors include:

- IP67 Rated to prevent water intrusion in all environmental conditions
- +/- 0.5 degree accuracy improves RF optimization
- Low temperature drift provides reliable data in extreme environmental conditions
- Digital filtering for stable measurement
- "Hot swap" installation method to eliminate system downtime

Extreme Integrated RET Solutions

One motor per band for multi-band products:

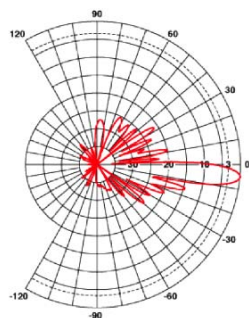
- Seamless evolution for user
- Pre-integrated and tested at production step
- One single reference for order
- Extensive internal validation process ensures a very low failure rate

4.3-10-Compatible Interface

RFS' 4.3-10-compatible connectors support future-proof multi-band antenna deployments, feature optimized PIM stability, and allow customers to achieve the highest performance with the new 4.3-10 interface standard. Available for many new multi-band antennas!

Unique WindMaster™ Radome Design

The distinctive design features a half-cylinder radome shape that reduces wind load up to 50 percent compared to others on the market. It combines compact sizing with superior electrical performance, making RFS' Windmaster radome design particularly well-suited for urban environments where space constraints and interference present challenges.



Patterns

The following pattern configurations are available for download, and others are available upon request:

- Airpro
- Planet
- Mentum
- Granet
- ATOLL

Note: Easily and instantly access and download multiple pattern configurations via the datasheets on the RFS eCatalog!



ADVANCE
your horizon

Simplifying Antenna Deployment

Universal Mounting System

ONE antenna mounting kit for all BSA antennas!

A single, flexible mount system suitable for all RFS base station antennas allows for convenient, one-handed adjustment. More than 98% of the RFS antenna portfolio uses the universal mount.

APM40 Universal Mounting Hardware features include:



- Basic direct mount kit for all antenna types
- Rugged design supports up to 200Km/h wind load
- Pipe diameter: 60-120 mm, wall mount option
- Mechanical downtilt: 0-10°
- Eases training and learning curve

APM40 upgrades include:

- Scissor kit for more tilt and azimuth adjustment up to +/-30°
- Options for 3 sector kit
- Option for small pipe diameter: 30-60 mm

Watch our mounting videos to see just how easy it can be:

<http://www.rfsworld.com/global-mounting-apm40-series,106,1.html>

Convenient Retrieval of RET Serial Numbers in the Field

When the RET is internal, stickers on the antenna radome provide quick and easy access to the internal RET serial numbers, resulting in easy on-site commissioning and secured remote mapping from the remote operation (OMC).

Complete AISG E2E Solutions



RFS offers many additional products to complete your end-to-end solution, including:

- AISG cables
- Tower-Mounted Amplifiers
- Power Distribution Units
- Software NEM-ALD-W
- Protocol adapter to PC



QR codes

RFS' BSA products come with a helpful QR CODE on the package. Simply scan the code for access to datasheets, installation instructions, and much more.

Innovating for the Trends of Today... and Tomorrow

Antenna complexity will continue to increase for the foreseeable future. RFS not only offers the ideal base station antennas for today's networks, but also develops its products with a keen eye on what may be on the horizon to help customers pave a smoother path for new bands or to 5G.

RFS's antenna portfolio is driven by the need for:

- More bands per antenna
- New bands in both high and low frequencies
- More throughput
- Innovative designs, such as RFS' transparent antennas



Trust RFS

for Superior Customer Support and On-Time Delivery

RFS worked with a major global operator to develop a unique quad-band antenna and re-design existing versions of several of their BSA antennas to be compliant with the operator's custom specs. Features such as WindMaster-shaped radome for excellent wind load performance helped distinguish RFS' antennas from the competition. By having a worldwide presence, RFS was able to accommodate short lead times and provide superior customer support. As a result, RFS became qualified as a supplier for the operator in 2012 for its 4G rollout starting with LTE 2.6. By the end of 2013, RFS had taken 50% of the market share of the operator's main affiliate in France, as well as secured orders with multiple other European affiliates.



Lab Equipment Introduction

No.	Equipment Name	Performance of Equipment	
	1 SG128 Near Field Test Range	Measurement capabilities: <ul style="list-style-type: none"> • Gain • Beamwidth • Cross polar discrimination • Sidelobe levels • Front to back ratio Frequency Bands: <ul style="list-style-type: none"> • 400 MHz to 6 GHz 	Max. size of DUT: <ul style="list-style-type: none"> • 3.5 M Max. weight of DUT: <ul style="list-style-type: none"> • 150 kg Size of SG 128(L*W*H): <ul style="list-style-type: none"> • SG128 1#: 6M * 6M * 6M • SG128 2#: 9.75M * 7M * 7M
	2 Cold/Dry Heat/Temp Cycling Chamber	Temperature Range: <ul style="list-style-type: none"> • -60 °C to +85 °C • 20% to 98% Temperature Fluctuation: <ul style="list-style-type: none"> • ≤±0.5 °C Temperature Uniformity: <ul style="list-style-type: none"> • ≤2 °C Temperature Deviation: <ul style="list-style-type: none"> • ±2 °C 	Heating Rate: <ul style="list-style-type: none"> • +25 °C to +85 °C / 60 min vCooling Rate: <ul style="list-style-type: none"> • +25 °C to -60 °C / 85 min Size of Chamber(W*D*H): <ul style="list-style-type: none"> • 2000mm * 3000mm * 3500mm (Interior Dimension)
	3 Salt Spray	Spraying Fall: <ul style="list-style-type: none"> • 1 to 2 mL/80cm 21hr PH of Salt Solution: <ul style="list-style-type: none"> • NSS ACSS 6.5 to 7.2 • ISO9227 6.0 to 7.0 	Temperature: <ul style="list-style-type: none"> • Salt Solution: +35 °C ±1 °C • Corrosion Solution: +50 °C ±1 °C Size of Chamber(W*D*H): <ul style="list-style-type: none"> • 3500mm * 2800mm * 1400mm (Interior Dimension)
	4 Rain Test	Rainfall: <ul style="list-style-type: none"> • 1500mm to 2500mm/h Max. weight of DUT: <ul style="list-style-type: none"> • 150 kg 	Size of Chamber(W*D*H): <ul style="list-style-type: none"> • 3000mm * 3000mm * 3500mm (Interior Dimension)
	5 Star-Lab Test Range	Measurement capabilities: <ul style="list-style-type: none"> • Gain • Beamwidth • Cross polar discrimination • Sidelobe levels Frequency Bands: <ul style="list-style-type: none"> • 650 MHz to 6 GHz 	Max. size of DUT: <ul style="list-style-type: none"> • 45 cm for spherical set-up • 2.7 M x 45cm for cylindrical set-up Max. weight of DUT: <ul style="list-style-type: none"> • 80 kg Size of Star-lab (L*W*H): <ul style="list-style-type: none"> • 6M * 2M * 2.5M
	6 Vibration Bench	Sinusoidal exciting force (peak): 30 kn Random exciting force (rms): 30 kn Bump exciting force(peak): 90kn Frequency Band: DC to 2800 Hz Sweep Rate: 2.5 m/ min	Displacement : 51 mm Max. weight of DUT: <ul style="list-style-type: none"> • 500 kg Size (L*W*H): <ul style="list-style-type: none"> • 1288 mm * 852 mm * 1145 mm
	7 Free Fall Test Bench	Max. Payload (kg): 100kg Drop Height (mm): 0-1000 Bottom Plate Size (mm): 2400x1600	Specimen Size(mm): 1000x1000x1000 Test Mode: Face, Edge, Corner
	8 S-parameter Test Chamber	Measurement capabilities: <ul style="list-style-type: none"> • VSWR, Isolation Test frequencies: <ul style="list-style-type: none"> • 100kHz ~ 6GHz 	
	9 PIM Test Chamber	Measurement capabilities: <ul style="list-style-type: none"> • PIM Test frequencies: <ul style="list-style-type: none"> • 700MHz • 850MHz • 900MHz 	Test frequencies continued: <ul style="list-style-type: none"> • 1800MHz • 1900MHz • 2100MHz • 2600MHz

Characteristic Description

The laboratory is equipped with an advanced multi-probe 3D spherical near field test SG128 system. This test system is the most outstanding system in the wireless communication industry and marks the great revolution of the 21st century! Get the most accurate test information quickly and at a glance!

The RFS equipment meets customer demand for testing with the ability to accurately simulate rapid changes in temperature and harsh natural environments such as low temperature, high temperature, high temperature and humidity, low temperature and humidity, etc.

The salt spray test is used to assess material and the protective layer of salt spray corrosion resistance ability. It is mainly used for metal plating, electronic components, chemical paint, paint, auto parts, screws. RFS can then analyze a variety of surface materials such as coating, electroplating, anodizing, rust-proof anti-corrosion treatment and test their corrosion resistance.

The rain test is used to detect the water level of products, meeting the national standard of IPX3, IPX4 two grade waterproof requirements. It is mainly used for assessment of whether electronic/electrical products shell/seals can maintain high performance status after water test or during the test, and testing of products which may be affected by the contamination of water during the transport process or use, to provide a reliable basis for the product's technical standard.

Measuring antenna test more accurate and faster @ 16 probes chamber. Using automatic scanning, the measurement results are displayed through the software, providing information at a glance. The results of the amplitude and phase can be used to analyze and diagnose antenna performance. The equipment is easy to move and takes up only a small amount of space.

The vibration bench test is a simulation of the main products in the transport and use stage encountering various conditions, to identify whether a product has the ability to successfully withstand environmental vibration. Suitable for mobile communication base station antenna, filter, communication cable connectors and other products. Includes detection of product structure vibration resistance, reliability and integrity.

Pneumatic zero drop test stand is a new and innovative method designed according to the ISTA packing test standard, which is mainly used to assess the drop bearing capacity of the larger packaging product in the movement, transportation and handling process. It easily completes the drop tests of the surfaces, edges and corners from different heights.

Used to detect the electric performance parameters of the samples according to the technical specification of test samples; test results are evaluated according to test data.

Used to detect the electrical performance parameters of the samples according to the technical specification of test samples; test results are evaluated according to test data.

RFS E-Catalog

Create your own RFS catalog!

Find, compare, and make informed product decisions using RFS' convenient e-Catalog (<http://www.rfsworld.com/product-solutions,535,1.html>). Search instantly by product descriptions or model numbers to choose the products that are right for your installation.

SEARCHING:

RFS' e-Catalog facilitates product searches using full and partial model numbers, descriptions or keywords, and by product type or solution set. Add or remove desired features with available search filtering to capture the subset you're looking for.



☐ Description ☒ Model Number [Get Help](#)

apxvfw

Search

6 results for your search **APXVFW**

Refine your search by selecting a specific Product Type or Solution.

PRODUCT TYPES

Panel Antennas - Wireless
(eCatalog)

Panel Antennas - All Products
(eCatalog)

MY E-CATALOG

Your e-Catalog is empty

Create your own RFS catalog.
Just add documents to your
e-Catalog, organize it and
download it!

RELATED PRODUCTS

Please choose an item from the
adjacent table and click on the
appendant 'See related Products'
icon.

Panel Antennas (6)

Compare selected products (limit of 5 products)

Select all -Unselect all

10 products display on 6 results

Page 1 Items/page 10

Selection	See product details	Model Number	Product Name
<input type="checkbox"/>		X2-C-120B	RF X-TREME™ Cross Polarized Triple Band (6 port) Antenna, 698-894 / 1695-2360 MHz, 65deg, 14.0/17.3/17.3dBi, 4ft, VET, RET & Bias-T
<input type="checkbox"/>		1W12X-C-NA20	RF X-TREME™ Cross Polarized Triple Band Antenna, 698-2360MHz, 65deg, 13.6/16.3/17.2dBi, 4ft, VET, RET
<input type="checkbox"/>		APXVFWW18X2-C-120B	RF X-TREME™ Cross Polarized Triple Band (6 port) Antenna, 698-894 / 1695-2360 / 1695-2360 MHz, 65deg, 15.5/18.6/18.6dBi, 6ft, VET, RET & Bias-T
<input type="checkbox"/>		NA20	RF X-TREME™ Cross Polarized Triple Band Antenna, 698-2360MHz, 65deg, 15.1/17.5/18.3dBi, 6ft, VET, RET
<input type="checkbox"/>		APXVFWW24X2-C-120B	RF X-TREME™ Cross Polarized Triple Band (6 port) Antenna, 698-894 / 1695-2360 / 1695-2360 MHz, 65deg, 16.5/18.6/18.6dBi, 8ft, VET, RET & Bias-T
<input type="checkbox"/>		APXVFWW24X-C-NA20	RF X-TREME™ Cross Polarized Triple Band Antenna, 698-2360MHz, 65deg, 16.0/17.5/18.3dBi, 8ft, VET, RET

See product details legend

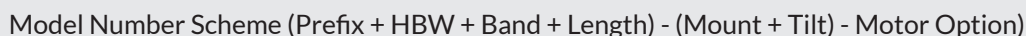
Add to my e-Catalog Download PDF datasheet View product datasheet View related documents See related Products



ENHANCED FUNCTIONALITY FOR POWER USERS:

Download installation instructions from datasheets, access the pattern type you need, compare up to five products and even build your own, indexed custom eCatalogs.

All RFS model names are based on a naming structure that tells you:

19



For more information, please contact the
nearest RFS sales office:

www.rfsworld.com

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