SPECTRUM
Advanced Specialty
PRODUCTS
A Spectrum Control Business

Antennas & Assemblies

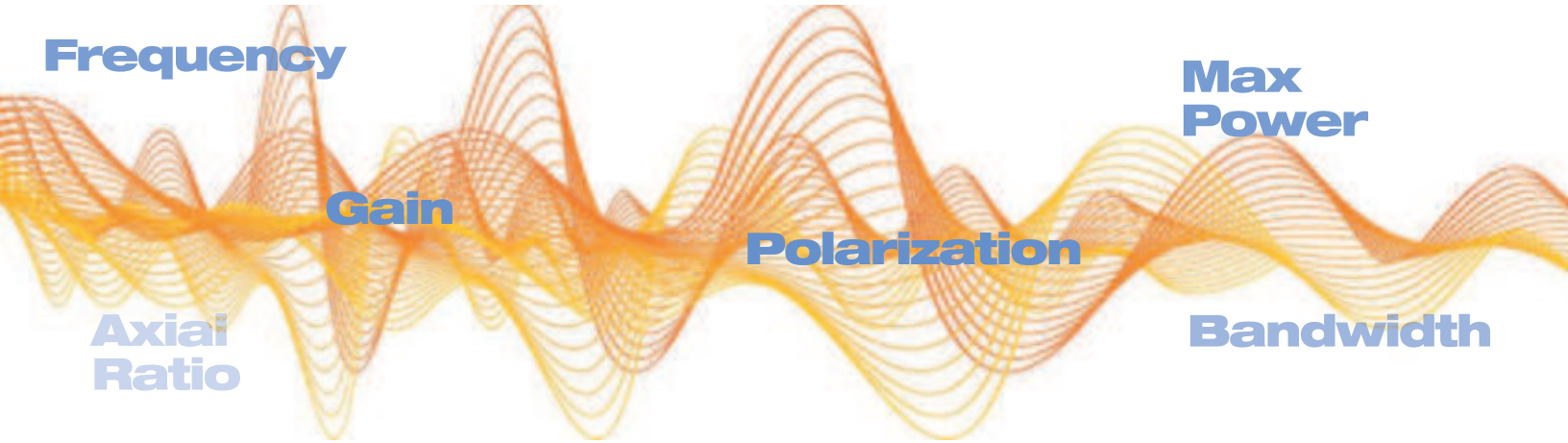
Antenna Assemblies

Patch Antennas



Antennas & Assemblies

custom designs for critical data transmission



Antenna Solutions

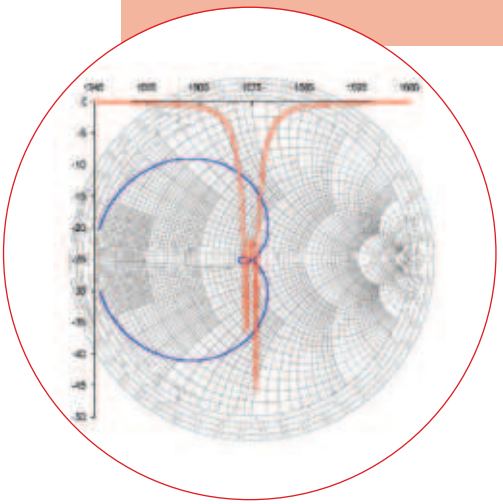
Finding the ideal antenna to ensure the wireless reception of your system can be a challenge. We design and build custom application-specific antennas exceeding your electrical and mechanical parameters. Our antenna specialists use sophisticated simulation software and in-house testing to optimize your antenna. And our vertical integration allows us to use a wider range of materials in the manufacturing process and deliver prototypes and production volumes in shorter lead times.

The end result is a high performance antenna designed and built just for your application and budget.

Antenna Assemblies can be designed and optimized for a wide range of wireless applications. Antenna types include aperture, slots, loops / magnetic dipole, planar, helical, beam forming-static, custom networks and switched arrays… **AA5-AA6**

Patch Antennas are lightweight and versatile offering a typical gain response from 0 dBi to 3 dBi for half-power beamwidths of 110° for both satellite and terrestrial based applications… **AA7-AA8**





Patch Antenna Applications

Satellite and wireless ground based data systems that utilize GPS (Commercial L1 and Military L2), Globalstar, Iridium, Inmarsat, and ISM systems.

Antenna Assembly Applications

Portable defibrillators, race monitoring, asset tracking devices, tank monitoring, directional finders, survey and toll meter equipment, down-hole drilling, automatic meter reading, weather recorders/balloons, short distance wireless data transfers, ocean buoys

SPECTRUM ADVANCED SPECIALTY PRODUCTS • 8061 Avonia Rd. • Fairview, PA 16415 • Ph: 814-474-1571 • Fax: 814-474-3110 • www.SpecEMC.com
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Antenna Solutions

Creating the ideal antenna and/or antenna system to ensure the success of your product can be a challenge. At Spectrum Advanced Specialty Products (SASP), we design and build custom application-specific antennas and antenna systems. Our team possesses hundreds of cumulative years of experience in the art and science of RF engineering, electrical engineering, materials science and state of the art manufacturing.

We are the industry's only true vertically integrated antenna solutions and systems provider. As the flow diagram to the right illustrates, we will develop and produce your antenna completely in-house, from concept through manufacturing and delivery. This extensive range of capabilities and broad base of technologies allows our engineers greater freedom to pursue the optimum antenna design... meeting your expectations for performance and cost.



Application Consulting

Our application specialists will work with your product development team to identify the critical parameters and requirements for your antenna system.The experienced SASP field specialists evaluate your application's mechanical and environmental factors to ensure our design team receives all of the relevant information to develop the most effective antenna solution.

Antenna Types

Spectrum will apply the ideal antenna technology to meet the dynamic challenges of your application. Our typical products have high efficiency and high gain in various applications over the 400 MHz to 8 GHz range. Below are some of our more common antenna types:

- Aperture
- Spiral
- Cavity backed
- Log periodic
- Slot
- Loops/magnetic dipole
- Planar
- Helical-mono-filer, Bi-filer, Quadra filer
- Beam-forming static
- Custom network/balun
- Switched array
- Extreme bandwidth antenna (EBA)

Applications

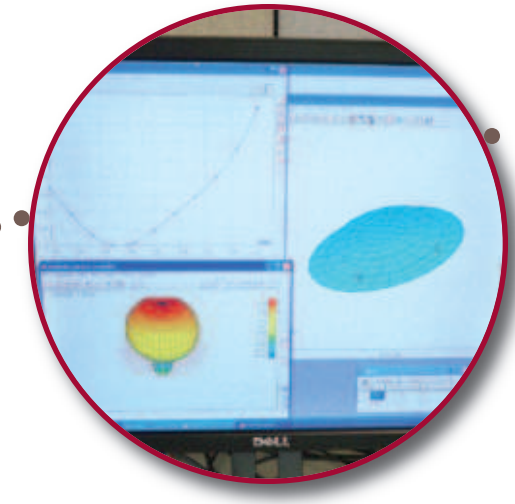
- Military / DOD
  - UAV's, Electronic warfare, Satcom
  - Com on the move/halt, Soldier wearable/First responder
- Asset tracking devices
- Medical / Surgical
  - Patient monitors worn/base, Portable defibrillator
- Industrial monitoring
- GPS and direction finder
- Highway / Toll metering equipment
- Oil patch / Down-hole drilling
- Automated meter reading (AMR)
- Weather recorder / balloon
- Marine / ocean buoy
- Civil aircraft and military aviation
- Survey equipment
- Homeland security
- Marathon / race timing tag
- All mission critical environments
- Not-off-the-shelf (NOFS)

Spectrum's Solu Capabilities



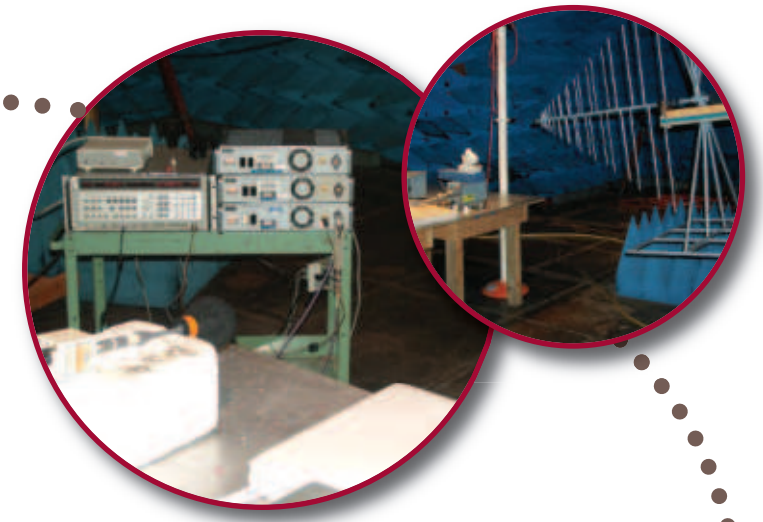
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In-House tions



Simulation & Design

The SASP design team reviews items such as board layout, ground plane size, mounting methods and port measurement, in conjunction with polarization, radiation patterns, gain, impedance matching and frequency tolerance criteria. We then apply sophisticated computer modeling software to design your antenna which quickly moves to a functional prototype.



Testing & Measurement

All of our potential antenna solutions undergo thorough performance testing. Our NARTE certified staff conducts a range of return loss, bandwidth, polarization and efficiency measurements. In-house capabilities are aided by our on-site anechoic chamber, which is used to validate the antenna's performance.

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Materials Expertise

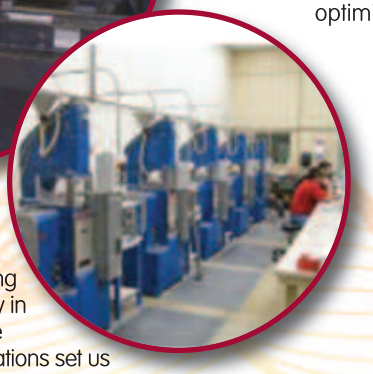
We have a long history of developing ceramic and other materials as part of our design and development process. Our material scientists control all aspects of the process from formulating, to forming, to heat treating, to finishing. This unique expertise allows for the application of the ideal materials to optimize performance.



Global Logistics

Effective inventory and logistics management is essential to success in today's global economy. We have created a network of sales and design centers, manufacturing plants and distribution facilities to support the world's major markets. We are committed to being an ideal partner for our worldwide OEM customers.





Manufacturing Capabilities

SASP offers a range of manufacturing capabilities that allow great flexibility in antenna applications. Our extensive machining and metalworking operations set us apart from other antenna suppliers and support some of our antenna housing/mounting solutions. With five manufacturing facilities, including two low cost centers, we're poised to handle large or small volume requirements.

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Antenna Assemblies



Design Knowledge

Spectrum Advanced Specialty Products has vast knowledge and experience in advanced computer simulation, allowing us the ability to manufacture custom solutions and military hardened assemblies for any of your antenna assembly needs.

Features

- Design multi-antenna systems
- Quick “hand-tuned” prototypes for testing
- Design considerations:
  - Frequency vs. size
  - Pin tapping point
  - Impedance and resonant frequency
  - Axial ratio and polarizations
  - Voltage standing wave ratio
  - Bandwidth

Antenna Types

- Aperture
- Slots
- Loops/magnetic dipole
- Planar
- Helical
- Beam forming-static
- Custom networks
- Switched arrays

Applications

- Portable defibrillators and patient monitors
- Thoroughbred and sport dog racing monitoring
- Asset tracking devices
- Tank monitoring
- Fish, golf range and directional finders
- Toll meter equipment
- Down-hole drilling
- Automatic meter reading
- Weather recorders/balloons
- Short distance wireless data transfers
- Ocean buoys
- Survey equipment
- Homeland security
- Marathon tags

Performance Attributes

- Frequency ranges within -300 MHz to 6 GHz
- Low VSWR
- High efficiency
- High gain

For complete specs and drawings, visit www.SpecEMC.com/antenna

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Patch Antenna Assembly Options

Features

- Available in partial assembly to complete "Plug-n-Play" assemblies
- Single or multifrequency packages
- Optimized designs for peak performance
- 100% tested
- Custom designs
  - Flexibility on cable and connector selection
- Standard designs available
  - AeroAstro SENS
  - Globalstar
  - Iridium
  - GPS
- RoHS compatible parts available

Optimizing Performance

Don't trust your wireless reception to luck. Let us help you design it right the first time. Our engineering team is ready to help identify critical issues such as the board layout, ground plane size, mounting methods and port measurement that will influence the efficiency of the antenna. We'll look at the polarization and radiation patterns, gain, impedance matching and frequency tolerance to determine the ideal patch for your design. With our computer modeling abilities, we can quickly determine your best options. In addition, we also have an on-site anechoic chamber to validate performance. Our flexible manufacturing and testing processes allow us to easily accommodate the required adjustments to supply an optimized antenna.

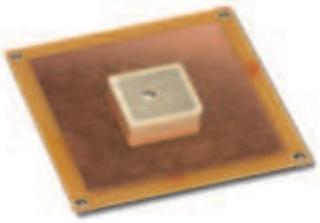
Our designs can be modified to meet your mechanical, cable length, connector and other specification. Each design is evaluated to provide an optimized performance to exceed your electrical and mechanical parameters. *Please consult factory with your specific details.*

Quick Turn Prototypes

We can provide quick turn prototypes by using our on-site engineering lab to hand tune an existing design to meet your specific needs. For advanced designs, we utilize 3-D computer modeling to optimize antenna performance and provide expected real world results of high volume production.

AC Series

Patch Antenna mounted on a ground plane with a connector mounted directly to the PCB. Standard connector is MMCX.



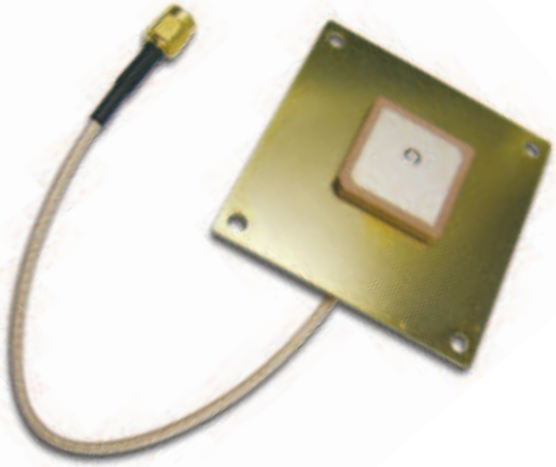
AR Series

Patch Antenna mounted on an optimized ground plane with a pigtail cable to a connector, which is tuned and packaged for the plastic radome that covers the complete assembly. Standard cable is RG-316 to MMCX or SMA connectors, others available.



AP Series

Patch Antenna mounted on a ground plane with a pigtail cable to a connector. Standard designs have 6" (15.2 cm) RG-316 cables, connector varies by application. Alternative lengths and connectors available.



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Patch Antennas

Patch Antenna Attributes

Small Footprint - Dimensions for antennas from 1 GHz to 3 GHz are from 13mm to 50mm square (excluding the ground plane).

Low Profile - Antennas designed with higher dielectric values are typically <8mm in height and depending upon your bandwidth requirement can be as low as 4mm.

Lightweight - These small antennas can be worn on people with little notice.

Versatile - Antennas not only transmit and receive circularly polarized signals but also linearly polarized signals.

Low Cost - Our antenna elements are very affordable in small and large volume.

Flexible - Antennas can be tuned and optimized very easily making prototyping quick and cost effective.

Omni-directional - Antenna radiation patterns provide excellent gain across all elevation angles but can also be manipulated for more focused requirements.

Performance - These passive devices offer typical gain response from 0 dBi to 3 dBi for half-power beamwidths of 110 degrees. Gain at boresite (90 degrees elevation) can exceed 6 dBi depending upon the proper selection of a ground plane.

Military - We have extensive experience in building hardened military designs.

Testing - All of our products are tested 100% on custom testing systems to ensure quality performance.

Key Factors

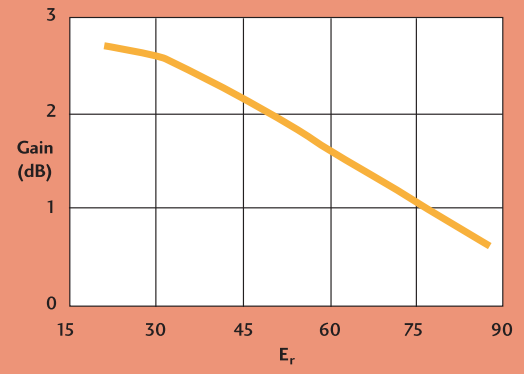
Ground plane - During the design process, consideration must be given to the size and configuration of the ground plane. The ground plane has substantial effects on the performance of the antenna. These effects include frequency shift, gain, axial ratio and radiation pattern.

Element Size - The amount of space available for the antenna element determines not only the material required but also the related performance that can be expected. The element size relates to the material that will be selected, the shape of the element, and the metallization pattern. Each of these has a substantial effect on electrical performance.

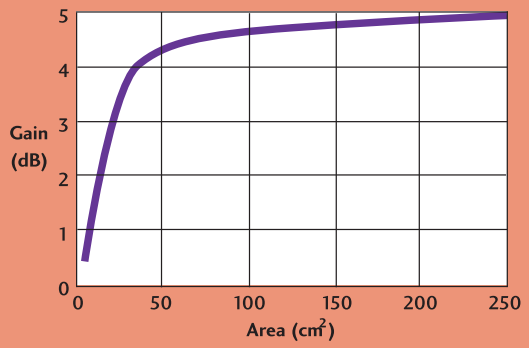
Assembly Configuration - The final assembly configuration also affects element performance. The position of other components, etc. affects the overall performance of the element.

The items mentioned above are areas in which Spectrum Advanced Specialty Products' engineering staff can assist in developing an optimized antenna element to fit your needs.

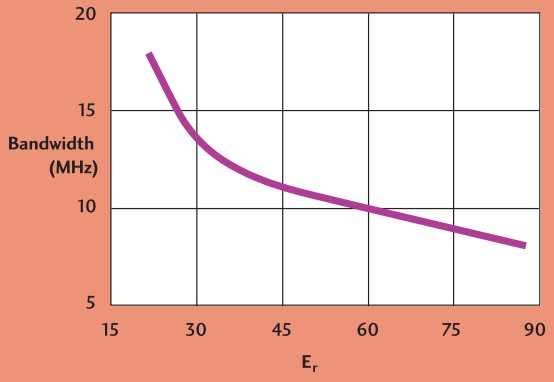
Gain vs. Dielectric Constant (f=1575 MHz)



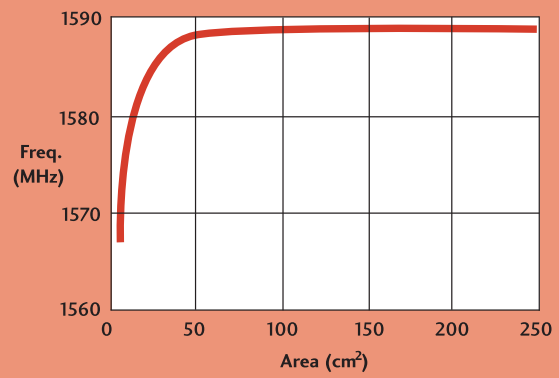
Gain vs. groundplane size (25 mm patch)



10 dB return loss bandwidth vs. dielectric constant (f = 1575 MHz)



Center frequency vs. groundplane size (25 mm patch)



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Patch Antenna Elements



RoHS COMPLIANT

Features

- Temperature stable (-40°C to +105°C)
- Low return loss
- Uniform dielectric constant
- Offset single-point feeding method
- Custom designs available (900 MHz to 5.8 GHz)
- Silver plated electrode and probe
- Surface mount
- 50 Ohm impedance
- RoHS parts available

Ordering Information - Standard Single Frequency Patch Element

PA	25	-	1575	-	008	S	A
Class	**Size**		**Center Frequency (MHz)**		**Bandwidth (MHz)**	**Configuration**	**Series**
Patch Antennas	2 digits in mm		Use 4 digits		Use 3 digits	**S** = Square	Assigned by factory

Application	Part #	Polarization	Center Frequency (MHz)	2:1 VSWR Bandwidth (MHz)	Gain (dB)	Tested ground plane (mm)
GPS	PA13-1580-005SA	RHCP	1580	8	2.5	30X30
GPS	PA18-1580-010SA	RHCP	1580	15	0.0	50X50
GPS-military (L2)	PA25-1227-008SA	RHCP	1227	20	0.0	60X60
GPS	PA25-1575-008SA	RHCP	1575	20	2.5	35X35
GPS	PA25-1579-008SA	RHCP	1579	20	2.5	35X35
Globalstar	PA25-1615-025SA	LHCP	1615	25	3.0	60X60
Iridium	PA25-1621-025SA	RHCP	1621	25	4.0	60X60
ISM	PA28-2450-120SA	RHCP	2450	120	4.0	45X45
Inmarsat	PA45-1592-175SA	RHCP	1592	125	5.0	60X60
RFID	PA780915030SALF	LHCP	915	30	3.0	101.6X101.6

In most cases to order RoHS versions, remove dashes in part number and add "LF" to the end of the part. Ex: PA251575008SALF (RoHS version) Consult Factory for custom parts or optimized center frequencies for your specific applications.

Dual Frequency SMD Patch Element

Spectrum Advanced Specialty Products offers an innovative solution for dual frequency applications. Our individual SMD antennas can be mounted on a single ground plane to address both frequencies at once.



Part #	Application	Ground Plane Test Size (mm)	Reference Outline
PA451615-1575SA	Globalstar & GPS (Comm)	63X63	LHCP
PA451621-1575SA	Iridium & GPS (Comm)	63X63	RHCP
PA451592175SLLF	Thuraya	63X63	LHCP

Consult Factory for full product details.

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Check out our online tools to help you find the product or system that meets your needs.

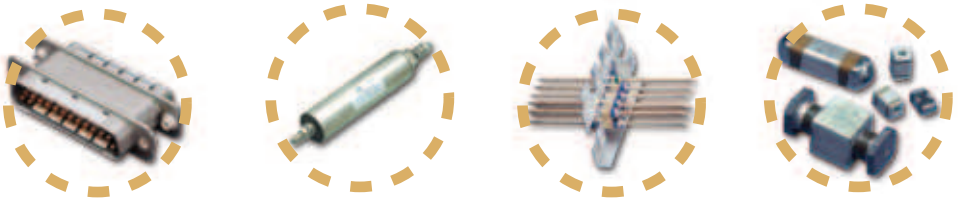
Instant Inventory Information

Check Stock will provide you with distributor names, part numbers, quantity on hand, online ordering capability and the last date inventory was updated for that particular component.

Check Stock

Project Starter

Design your product to meet the exact requirements of your application. Project Starter allows you to choose from multiple configurations to get a product that will best meet your application needs and you can even request a drawing, sample or quote of your custom product.



Spectrum Advanced Specialty Products

8061 Avonia Road
Fairview, Pennsylvania 16415
Phone: 814-474-1571
Fax: 814-474-3110

Sales Offices

NORTH AMERICA
8061 Avonia Road
Fairview, Pennsylvania 16415
Phone: 814-474-1571
Fax: 814-474-3110

EUROPE
Spectrum Control GmbH
Hansastrasse 6
91126 Schwabach, Germany
Phone: (49)-9122-795-0
Fax: (49)-9122-795-58

CHINA
Spectrum Control Limited
2nd Industrial Area
Ling Tou Industrial Road
Qiad Tou Town, Dong Guan City
Guang Dong Province 523530
Peoples Republic of China
Phone: (011)-86-769-8343-7761
Fax: (011)-86-769-8343-7760

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- Amplifiers & Mixers to 28 GHz
- Filters & Switch Filter Assemblies to 40 GHz
- DROs, PLOs, VCOs & Synthesizers
- Integrated Assemblies to 47 GHz
- Hybrids to 50 GHz
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- Filtered Interconnect Devices
- Antennas
- Advanced Ceramics and Assemblies
- Specialty Connectors

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- Temperature Sensors
- NTC and PTC Ceramic Components
- PTC Heater Assemblies
- Panel Input Controls

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SPECTRUM POWER Management Systems
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- Power Management and Distribution Systems
- Remote Management Systems
- Monitoring Equipment Environmental, Electrical, Security, Mechanical

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