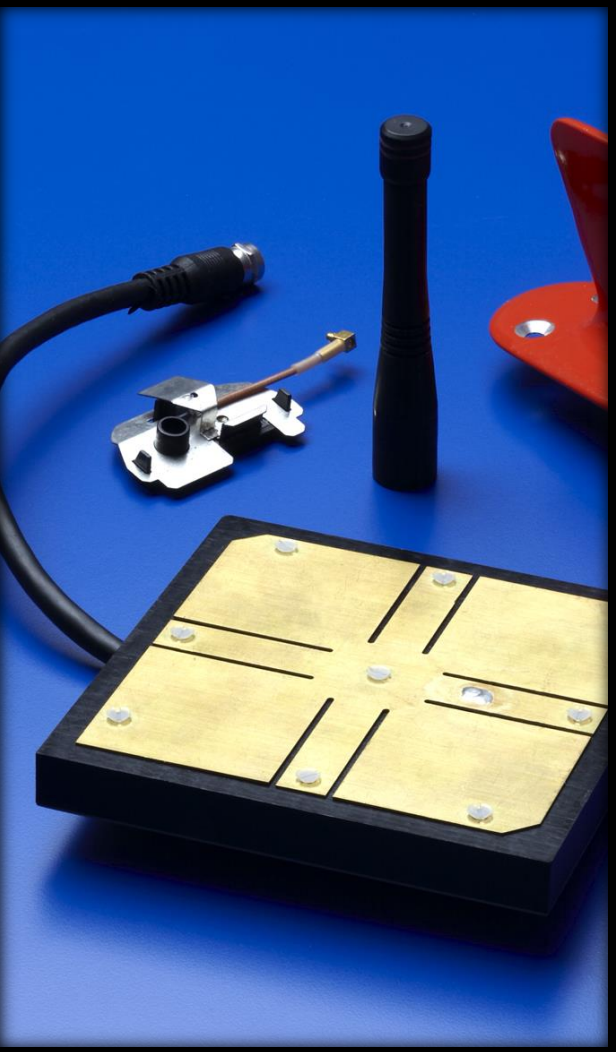


api technologies corp.

Antennas & Antenna Assemblies

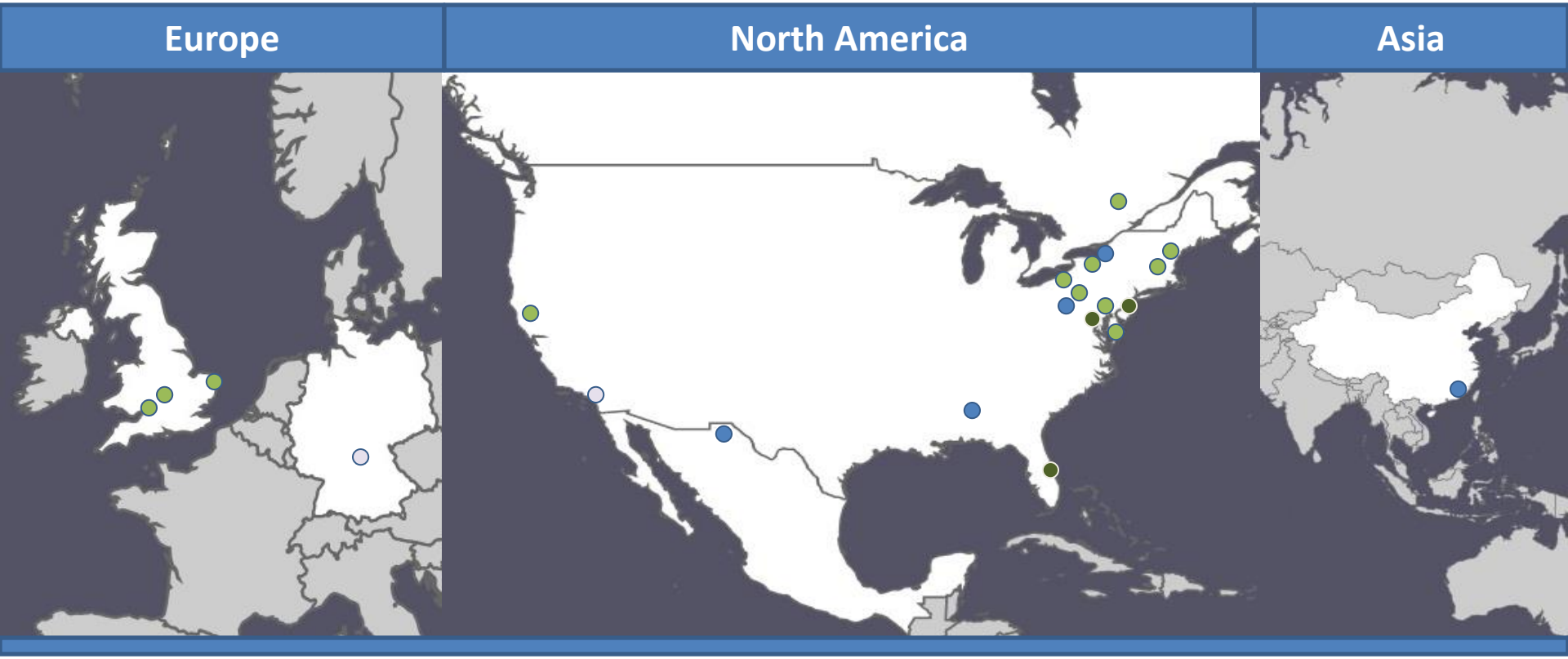
COMPANY SNAPSHOT

- Dominant technology provider of RF/microwave, microelectronics, and security products for critical and high-reliability applications
- Deliver high performance, innovative products and services for critical defense, aerospace and commercial applications
- 60% Defense / 40% Commercial
- Publicly traded (NASDAQ: ATNY)
- 2,200+ Employees
- Annual revenues of over $325 million
- Company behind some of the most well-known product brands in the industry

Featured Product Brands

OUR FOOTPRINT

Design & Manufacturing Design Center Manufacturing Center Sales Office

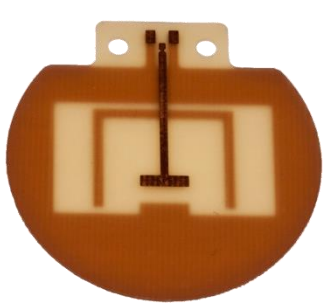


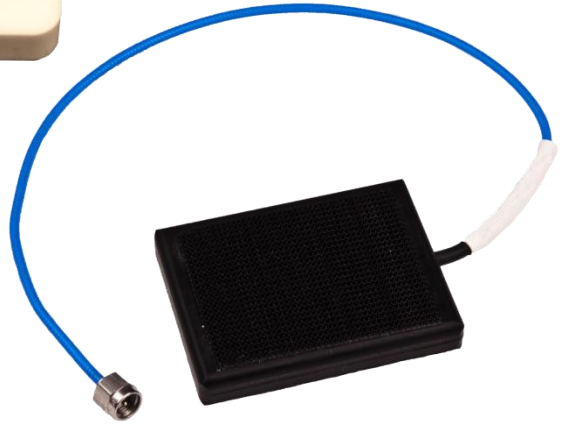
- 12 Trusted facilities worldwide (US, UK, Canada)
- Technology focused: Nearly 20% of our employees are engineers and skilled design professionals
- International manufacturing locations are API companies - not subcontractors; same equipment and processes as U.S.

ANTENNAS | OVERVIEW

API Technologies Designs & Manufactures Many Types of Antennas Including:

- *Patch*
- *High-Gain Planar Array*
- *Passive & Active Assemblies*
- *Soldier Wearable*
- *Aperture*
- *Slots*
- *Loops/Magnetic Dipole*
- *Helical Monofilar, Bifilar and Quadrifilar*
- *Custom Network/Balun*
- *Spiral*
- *Cavity Backed*



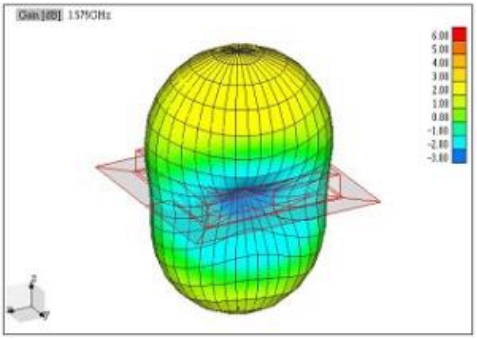
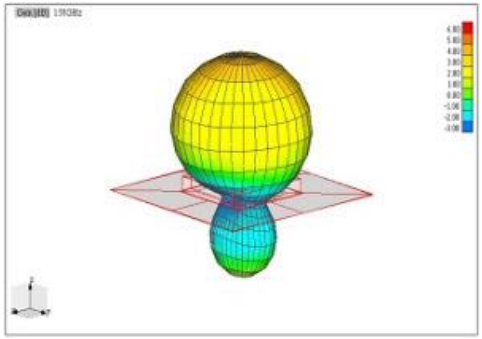
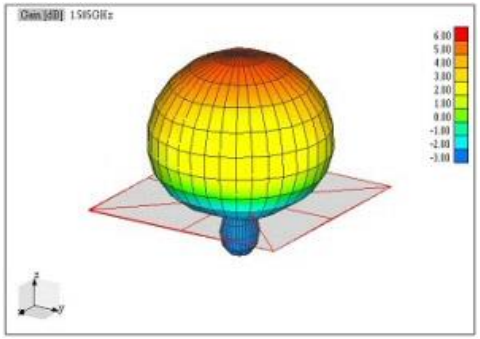
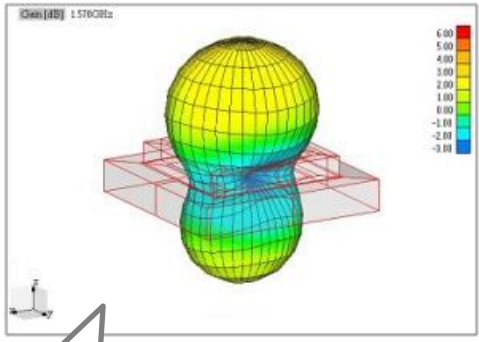


ANTENNAS | OVERVIEW

Antenna Applications

- *Satcom*
  - *Iridium*
  - *Globalstar*
  - *Inmarsat*
- *Asset Tracking*
- *Portable Defibrillators & EMS Notification*
- *Tank Monitoring*
- *Fish, Golf Range and Directional Finders*
- *Highway Safety*
- *Remote Meter Reading*
- *Down-Hole Drilling*
- *Machine to Machine Communication*
- *Weather Recorders/Balloons*
- *Short Distance Wireless Data Transfers*
- *Ocean Buoys*
- *Surveying Equipment*
- *Homeland Security*

ANTENNAS | OVERVIEW

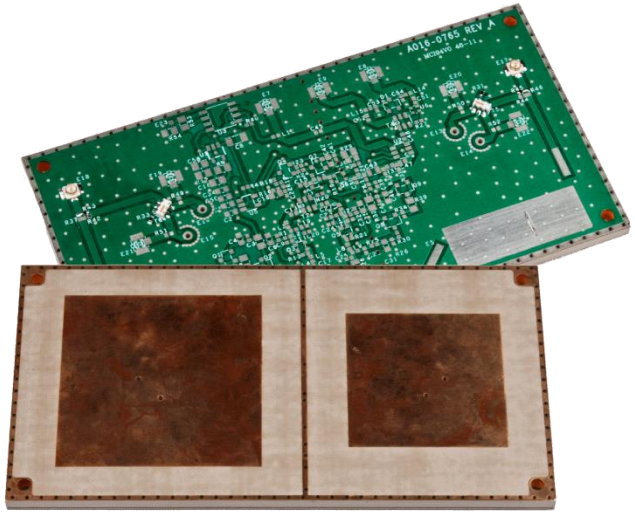
Antenna Features

- *Frequency Ranges from 150 MHz to 15 GHz*
- *Small Footprint*
- *Lightweight*
- *Rugged*
- *Low VSWR*
- *High Efficiency*
- *High Gain*

API utilizes multiple standard RF Antenna Design software packages plus proprietary software to expertly design our custom antenna solutions

ANTENNAS | CUSTOM SOLUTIONS

API Technologies will Design and Manufacture a Custom Integrated Antenna Assembly for your Unique Application



Pre-filtered GPS LNA with Antenna

- *This dual patch antenna assembly provides coverage for GPS L1/L2 and OmniSTAR*
- *Input is pre-filtered and amplified*
- *1.7 dB Noise Figure*
- *0.4” tall and weighs only 2.4 oz*
- *External antenna input and switching*

ANTENNAS | CUSTOM SOLUTIONS

Here are just a few examples of custom integrated antenna assemblies we can develop to meet your unique requirements:

- GPS w/ integrated LNA
- Soldier Wearable Antennas
- Low Observable Antennas
- Arrays
- RFID tag for Down-hole (oil & gas drilling)

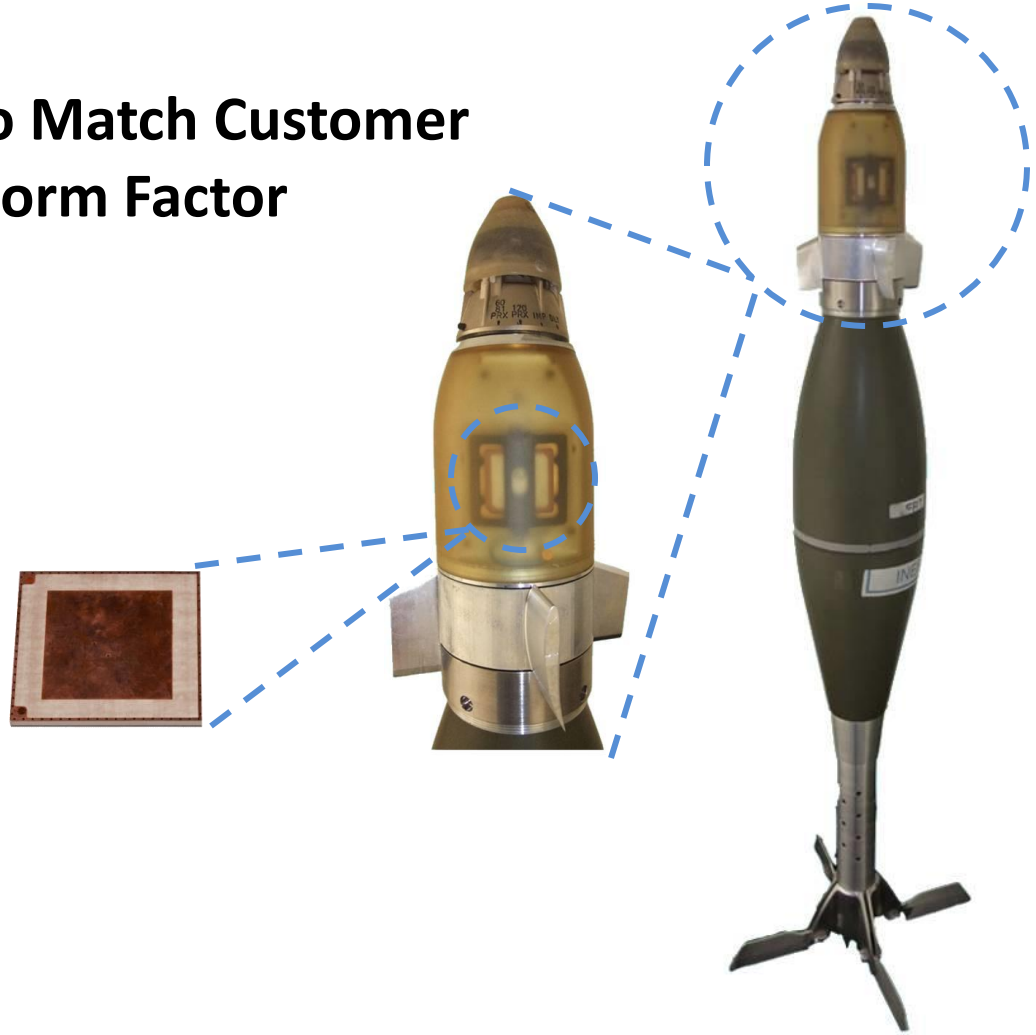
Range of frequencies typically covered:

- UHF, L-Band, S-Band, C-Band
- We have done work as low as 130 MHz and as high as 15 GHz

Contact the Factory for More Details!

ANTENNAS | CUSTOM SOLUTIONS

Optimizing Antenna Design to Match Customer Available Ground Plane and Form Factor



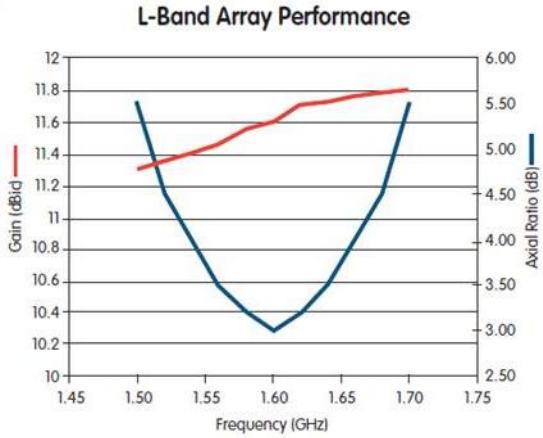
GPS Guided 120 mm Mortar

- *1575.42 MHz (L1)*
- *10,000 g*
- *Operating Temp -32 to 63°C*
- *Storage Temp -45 to 71°C*
- *Low Profile*
- *Other designs rated to 30,000 g*

ANTENNAS | L-BAND ARRAY

Features

- *Meets Inmarsat Class II Type Requirements*
- *High Performance in a Compact Design*
- *Circular Polarization*
- *50 Ohm Impedance*
- *Low VSWR*
- *Lightweight/Low Profile*
- *Tx Frequency Band: 1610-1676 MHz*
- *Rx Frequency Band: 1518-1560 MHz*
- *Gain: 11 dBic Min.*
- *Various array sizes available based on gain requirements*



Applications

- *Satellite networks*
- *Two-way voice data*
- *Data communications*
- *Broadband land portal terminals for military, construction, oil & gas and mining applications*

ANTENNAS | L-BAND ARRAY

Transmit Array	
Specification	Production Results
Frequency Range	1620 – 1680
Nominal Gain, Directivity	14 dB ± 0.5 dB
Side Lobes H Plane	13.7 dB
Side Lobes V Plane	14.7 dB
3 dB Beamwidth H Plane	33.1 degrees
3 dB Beamwidth V Plane	33.0 degrees
VSWR	< 1.5:1
CW Power (1600, 1620, 1680, 1700 MHz)	20 Watts (10 minute dwell time)
Type Antenna	2 x 2 Linear Patch Array
Nominal Impedance	50 Ohms
Polarization	Linear
Size (L x W x H)	12 x 12 x 1.1 inch
Connector	SMA Female Rear Mount

ANTENNAS | L-BAND ARRAY

Receive Array	
Specification	Production Results
Frequency Range	1470 – 1530
Nominal Gain, Directivity	13 dB ± 0.5 dB
Side Lobes H Plane	12.2 dB
Side Lobes V Plane	12.2 dB
3 dB Beamwidth H Plane	33.6 degrees
3 dB Beamwidth V Plane	35.4 degrees
VSWR	< 1.67:1
CW Power	2 Watts
Type Antenna	2 x 2 Linear Patch Array
Nominal Impedance	50 Ohms
Polarization	Linear
Size (L x W x H)	12 x 12 x 1.1 inch
Connector	SMA Female Rear Mount

ANTENNAS | PATCH

Variations of the Standard Ceramic Patch Elements

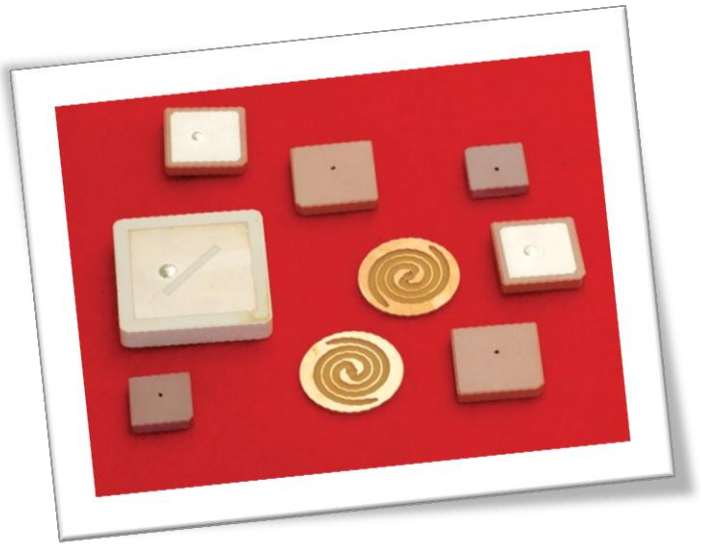
- The ceramic patch elements can be assembled onto a PWB with either a pigtail of RF cable (length & connector defined by customer) or an RF connector or packaged into a radome assembly with connector or RF pigtail
- Part number designators begin with:

  APxx, Patch element mounted on PWB with RF cable pigtail connector

  ACxx, Patch element mounted on PWB with RF connector

  ARxx, Patch element mounted in radome, may have pigtail & connector

  “xx” denotes the PAxx size element used in the assembly, such as PA25, xx = 25 mm

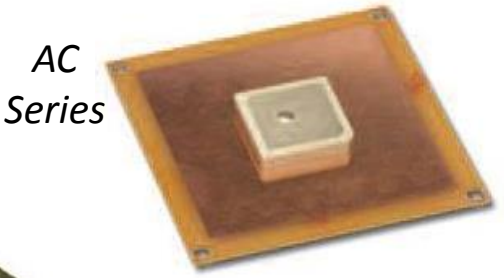


ANTENNAS | PATCH

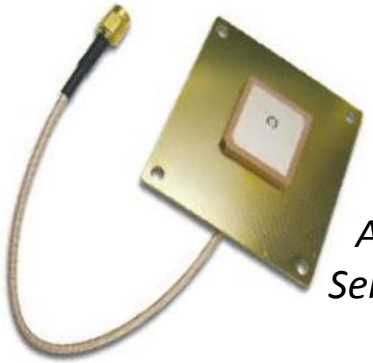
AC Series: Patch Antenna mounted on a ground plane with a connector mounted directly to the PCB. Standard connector is SMA.

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.

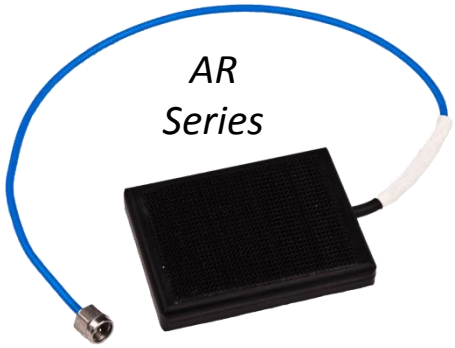
AR Series: Patch Antenna mounted on an optimized ground plane with a pigtail cable to a connector, which is tuned and packaged for the plastic radome that covers the complete assembly. Standard cable is RG-316 to MMCX or SMA connectors, others available.



AC Series



AP Series



AR Series

ANTENNAS | OFF-THE-SHELF (PATCH)

Custom tuning of ceramic patch element

- Many customers require custom tuning to meet their specific frequency requirements or to account for shifts in performance when embedded in their products
- We can custom tune any PA25, PA28, PA45 or PA78 size antennas
- Tuning is generally not required for PA45 and PA28 elements due to their large bandwidth. However, custom tuning can be done as needed
- Consult factory for specific applications & prices for tuning

ANTENNAS | OFF-THE-SHELF (PATCH)

Standard Solutions

Part #	Application	Polarization	Center Frequency (MHz)	2:1 VSWR Bandwidth (MHz)	Gain (dBic)	Tested Ground Plane (mm)
PA251615025SALF	Globalstar	LHCP	1615	25	3.0	60x60
PA451615-1575SA	Globalstar, GPS (Comm) GLONASS L1 & OmniSTAR	LHCP	1592	135	4.0	63x63
PA13-1580-005SA	GPS	RHCP	1580	5.0	0.0	30x30
PA18-1580-010SA	GPS	RHCP	1580	10	1.5	50x50
PA251575008SALF	GPS	RHCP	1575	20	2.0	35x35
PA251579008SALF	GPS	RHCP	1579	20	2.0	35x35
PA25-1227-008SA	GPS (military)	RHCP	1227	20	2.0	60x60
PA451592175SALF	Inmarsat, GPS (Comm), GLONASS L1 & OmniSTAR	RHCP	1592	175 (3:1)	4.0	63x63
PA251621025SALF	Iridium	RHCP	1621	25	4.0	60x60
PA451621-1575SA	Iridium, GPS (Comm), GLONASS L1 & OmniSTAR	RHCP	1592	175 (3:1)	4.0	63x63
PA282450120SALF	ISM, WiFI (802.11b), WLAN (802.11g) & Bluetooth	RHCP	2450	120	2.0	45x45
PA37-2450-150SA	RFID & Bluetooth	RHCP	2450	150	3.0	45x45
PA37-2400-050SA	RFID & Bluetooth	RHCP	2400	50	3.0	45x45
PA780915030SALF	RFID & ISM (ITU Region 2)	LHCP	915	30	3.0	101.6x101.6
PA780868030SALF	RFID & ISM (ITU Region 1)	LHCP	868	30	3.0	101.6x101.6

API TECHNOLOGIES' FEATURED CERTIFICATIONS

- All Manufacturing Facilities Certified to ISO 9001:2008
- 6 Certified AS9100 Facilities
- ANSI 20.20 Compliant Facilities
- Department of State ITAR Compliant
- Cleared Facilities & Personnel
- Six Sigma Greenbelts
- Hybrid Lab certified MIL-PRF-38534 (Class H and K)
- QPL MIL-PRF-15733 & MIL-PRF-28861 (Selected Products)
- MIL-STD 790 (DSCC), MIL-STD 1553 (Data Bus), MIL-STD 883 (Hybrid), MIL-STD 202 (Passive), MIL-STD-810 (Systems), MIL-STD 461 A/B/C/D/E (EMC), MIL-STD 1399 Surge (EMC)
- Solder/Assembly J-STD-001 Class 3 and IPC-A-610
- NEBS Approved (Selected Products)
- RoHS Compliant (Selected Products)
- TEMPEST Certifications including: CID/09/15(A), NSTISSAM TEMPEST/I-92, SDIP 27.

POINTS OF CONTACT

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Dennis.Barrick@apitech.com