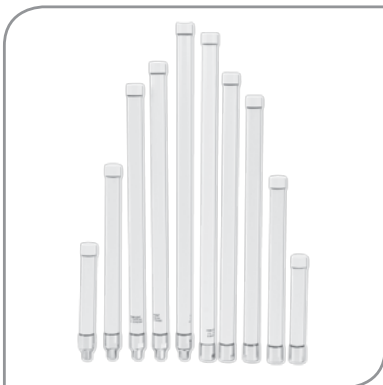




# **PulseLARSEN** *Antennas*

## SMALL CELL ANTENNA SOLUTIONS



**YOUR INTRODUCTION TO PULSELARSEN PAYMENT TERMINAL ANTENNAS.**

 Want to learn more? Visit our website at [pulselarsenantennas.com](https://pulselarsenantennas.com)

## Small Cell Solutions

Pulse Electronics antenna solutions for Smallcell deployments cover the varied market approaches including: femtocells, picocells, and metrocells. Whether your requirements are for 3G/4G, GPS or WLAN, Pulse Electronics design and manufacturing capabilities will provide the proper solution for you. Antenna solutions include integrated board mounted antennas, broadbanded directive elements, small array structures, MIMO combinations, IP rated omni antennas, active GPS assemblies and passive GPS elements.

Pulse smallcell solutions are integrated and designed to maximum performance, size and quality while optimizing costs allowing us to provide market leading products for our customers. Advanced manufacturing techniques also allow Pulse to drive market focus and provide innovative solutions for our customers when considering their roadmaps. Our advanced solutions offer weight reduction, overall system cost reduction, BOM simplicity and supplier reduction.

## Femtocell Solutions - 3G/4G

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## Custom Solutions

- Solutions for 3G/4G
- Incorporate many bands in complex shapes and sizes
- Reduce total volume needed for antennas
- Tunable antennas, passive antennas
- Single and dual fed structures

## W3722, W3723, W3724, W3731 & W3732

- Board mount solutions for 3G/4G requirements.
- Either specific band classes or wider bandwidths
- Solder directly to board no cables/connectors required



Questions? Call us at: **+1.800.ANTENNA**

## Picocell/Metrocell Solutions - 3G/4G

Picocell/Metrocell solution requirements typically fall into two categories: directive or omnidirectional antennas. Directive antennas are often dual polarized, single or broad banded and integrated into custom mechanics. Pulse Electronics offers design and manufacturing techniques which optimize performance, reduce size and complexity while providing cost effectiveness. Our advanced manufacturing methods offer roadmaps that will reduce size and complexity

further, reducing weight, overall system cost and condense supplier chain.

Omnidirectional solutions fall under monopole or dipole antenna. These antennas are typically vertically polarized, IP67 and range in gain from 0 to 4 dBi. Monopole antennas must be mounted to Smallcell chassis while dipole solutions can be mounted in a variety of manners.

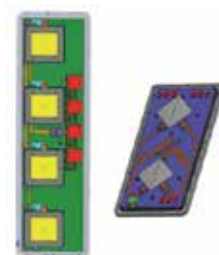
## Omni Directional Solutions

- IP67
- Monopole & Dipole designs available
- Monopole offer low height profile
- Dipole offer mounting options



## Custom Smallcell Directive Antennas

- Integrated into custom mechanics
- Single banded or broadbanded solutions
- Single and dual polarization with high isolation, low cross polarization performance
- Advanced manufacturing methods provide roadmap for industry leading solutions



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## GPS Solutions

GPS technology is often used for Smallcell location based or timing needs. GPS solutions can have either passive or active requirements. Pulse Electronics can provide GPS solutions in both these manners. Our active solutions can be integrated into custom plastics with optimized performance, or provided as an IP67

solution mounted in a variety of manners. Our passive GPS solutions include patch elements, ceramic pifa and ceramic monopole. Our expertise can help you decide which solution is best and offer design services to help integrate your solution successfully.

## GPS Available Solutions

- Pulse solutions offer both active and passive GPS products
- IP67 Products
- LNA gains of 13, 26, 30 dB with high filtering if needed
- GPS 13x13, GPS/Glonass 13x13, GPS 25x25 patches
- Industry leading linear ceramic elements



## WLAN Solutions

With today's bandwidth and data demands, WLAN/WIFI offloading has increasingly gained acceptance as a complementary solution. Whether integrated into the Smallcell device or mounted to the exterior of the Smallcell device, Pulse Electronics can fulfill your requirements. Whether you require single elements

integrated, various MIMO configurations for 802.11n or the emerging 802.11ac. Pulse Electronics can guide you to the right solution and layout. For IP67 exterior needs, Pulse Electronics has single and dual band solutions in both monopole and dipole configurations to suit today's high demands.

## WLAN Solutions

- Dual Band and single band IP67 dipole array and monopole solutions
- MIMO assemblies for 802.11n & 802.11ac
- Single elements for custom integration - can be optimized for MIMO performance

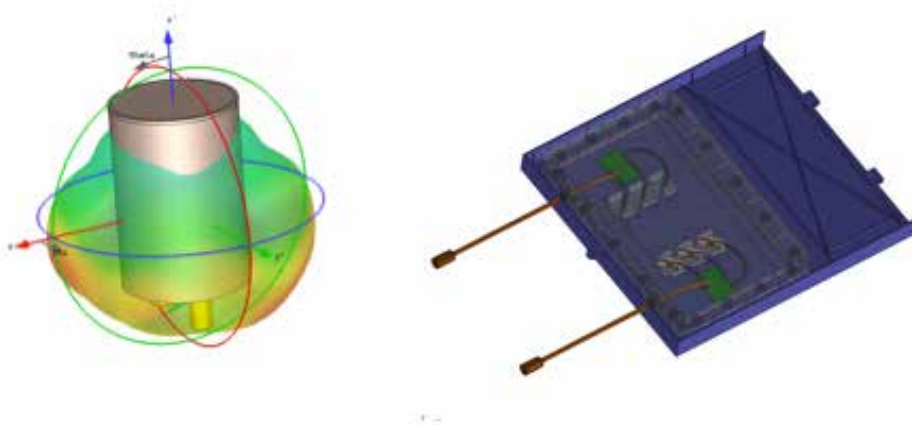


**PulseLarsen is able to design and perform state of the art simulations, prototypes and designs for manufacturing to respond to the small market needs.**

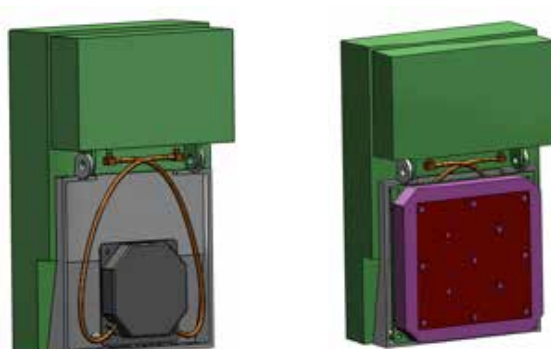
	Femto Cell	Pico Cell	Micro Cell
Customers	<ul style="list-style-type: none"> <li>• Households</li> <li>• Small Enterprises</li> </ul>	<ul style="list-style-type: none"> <li>• Large Enterprises</li> <li>• Sport Venues</li> <li>• Planes &amp; Trains</li> </ul>	<ul style="list-style-type: none"> <li>• Neighborhoods</li> <li>• College Campus</li> <li>• Malls</li> </ul>
Users	4-32 Indoor	32-64 Indoor/Outdoor	32-> Indoor/Outdoor
Benefits	<ul style="list-style-type: none"> <li>• Improved coverage</li> <li>• Reduced transport costs</li> <li>• Less congestion</li> </ul>	<ul style="list-style-type: none"> <li>• Better wireless service</li> <li>• No rooftop antenna</li> <li>• No interference</li> <li>• Increased network capacity</li> </ul>	<ul style="list-style-type: none"> <li>• Easy deployment</li> <li>• Higher data rates</li> <li>• Co-channel deployment</li> <li>• Higher capacity</li> </ul>
Range	-10m	Up-to some 100m	Up-to 1km
Drawbacks	<ul style="list-style-type: none"> <li>• Interference</li> <li>• Privacy</li> <li>• Potential RF Radiation</li> </ul>	<ul style="list-style-type: none"> <li>• IP backhaul may not be available Everywhere</li> </ul>	<ul style="list-style-type: none"> <li>• High installation costs</li> <li>• Limited expansion capabilities</li> </ul>

To accommodate all types of technical challenges, PulseLarsen has designed an unlimited amount of antenna types, for multiple frequency bands.

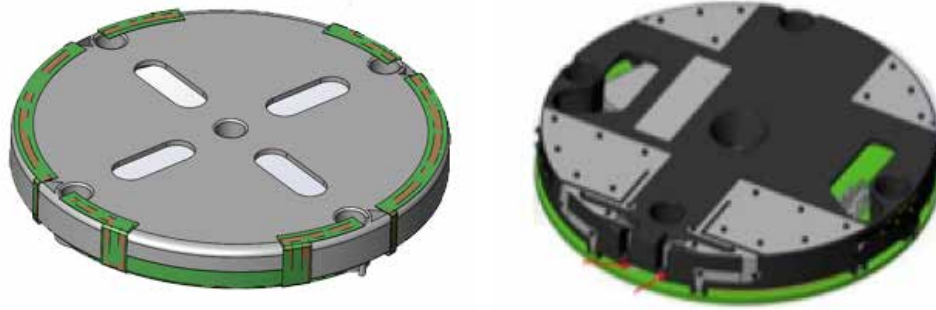
**5GHz LAA Omnidirectional or Directional Antennas**



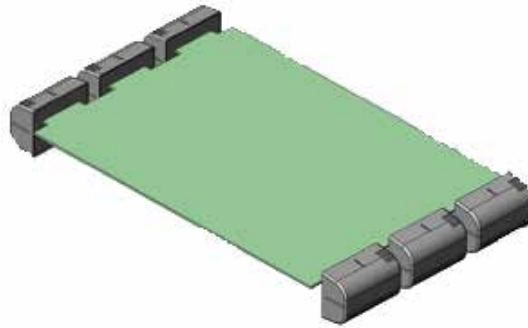
**LTE high band and low band Directional Antennas**



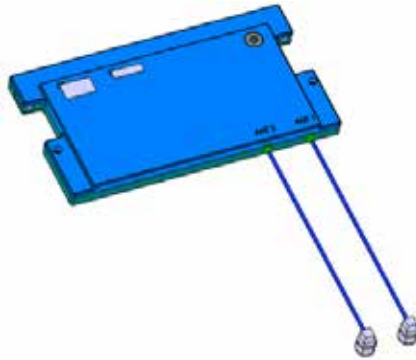
## Femtocell Embedded LTE MIMO Antenna Combo



## Picocell Embedded Modular Combo for 4G, WIFI and LAA



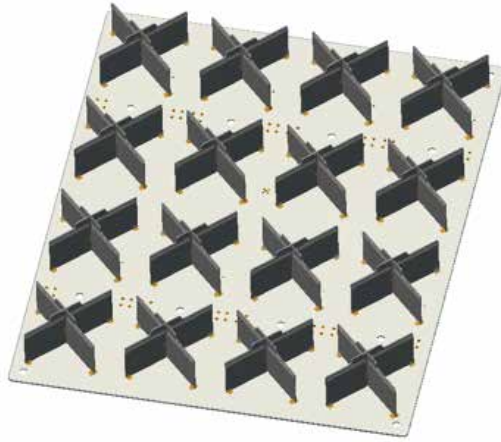
## Directional Dual-Polarized 1900MHz Antenna



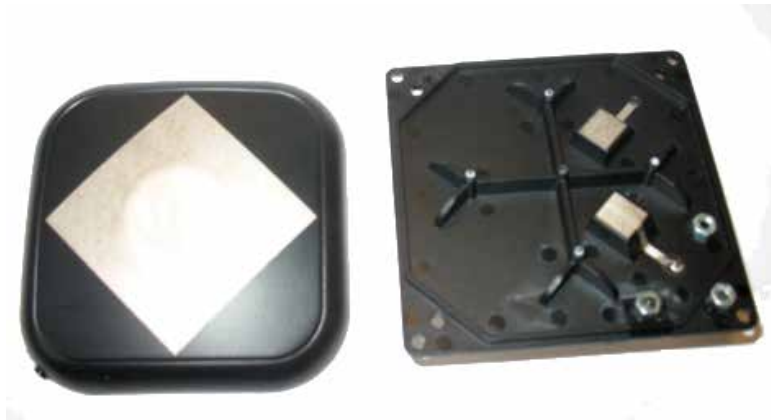
## LTE Antenna Sub-Arrays and Panels



## 5G Array Panels



## 3D Printed Radiators for Maximum Antenna Volume Optimization



## Cross Polarized LTE MIMO Compact Antennas





## CONTACT US TODAY!



Call us at **+1.800.ANTENNA**



Visit our website at: **[pulselarsenantennas.com](http://pulselarsenantennas.com)**



Connect with us on twitter: **PulseLarsen1**



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