YOUR INTRODUCTION TO PULSELARSEN PAYMENT TERMINAL ANTENNAS.

Want to learn more? Visit our website at 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.

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<tr>
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<th>Femto Cell</th>
<th>Pico Cell</th>
<th>Micro Cell</th>
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<tr>
<td>Customers</td>
<td>• Households</td>
<td>• Large Enterprises</td>
<td>• Neighborhoods</td>
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<td>• Small Enterprises</td>
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<td>• Planes &amp; Trains</td>
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<td>Users</td>
<td>4-32 Indoor</td>
<td>32-64 Indoor/Outdoor</td>
<td>32-&gt; Indoor/Outdoor</td>
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<td>Benefits</td>
<td>• Improved coverage</td>
<td>• Better wireless service</td>
<td>• Easy deployment</td>
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<td></td>
<td>• Reduced transport costs</td>
<td>• No rooftop antenna</td>
<td>• Higher data rates</td>
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<td></td>
<td>• Less congestion</td>
<td>• No interference</td>
<td>• Co-channel deployment</td>
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<td></td>
<td></td>
<td>• Increased network capacity</td>
<td>• Higher capacity</td>
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<tr>
<td>Range</td>
<td>-10m</td>
<td>Up-to some 100m</td>
<td>Up-to 1km</td>
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<td>Drawbacks</td>
<td>• Interference</td>
<td>• IP backhaul may not be available</td>
<td>• High installation costs</td>
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<td></td>
<td>• Privacy</td>
<td>Everywhere</td>
<td>• Limited expansion capabilities</td>
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<td></td>
<td>• Potential RF Radiation</td>
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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