

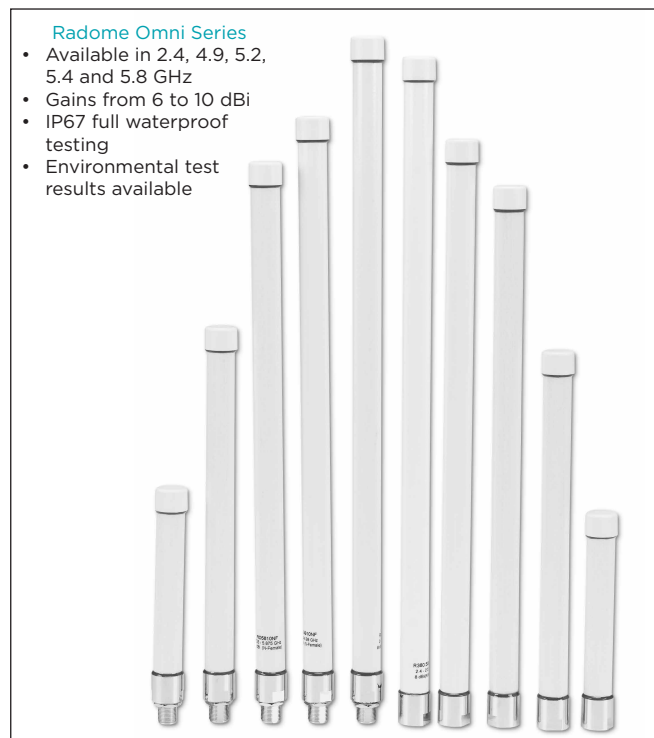
Pulse offers WLAN antenna solutions for IEEE802.11 (a, b, g, n) providing single and multiple frequency solutions for 2.4, 4.9, 5 and 5.8 GHz. Antennas optimized for MIMO applications are also a feature of the Pulse range and technical capabilities. WLAN functionality is now offered as an extra frequency in many of the Pulse 3G or 4G solutions. Applications include routers, mini base stations, MESH networks, laptops, Netbooks and other consumer devices.

Pulse worldwide testing capabilities include both near-field and far-field anechoic chambers. Antenna packages designed for MIMO applications can be optimized for envelope correlation coefficient and mean effective gain in addition to the standard antenna measurements of gain, directivity, efficiency and radiation patterns.

Pulse provides a full custom design service, including specialized testing, in addition to a range of standard catalog WLAN products. Also available is a build-to-print full turnkey subcontract manufacture service for customers with their own design.

Outdoor Solutions

Pulse offers off-the-shelf outdoor antennas for frequencies of 50 MHz to 6 GHz and full custom capability on request. Outdoor solutions are windproof up to 100 mph and offer IP (Ingress Protect) ratings of IP65, 67 and 68 as requested. Key applications include metering, mesh networks, infrastructure, mini base station deployments and remote monitoring.



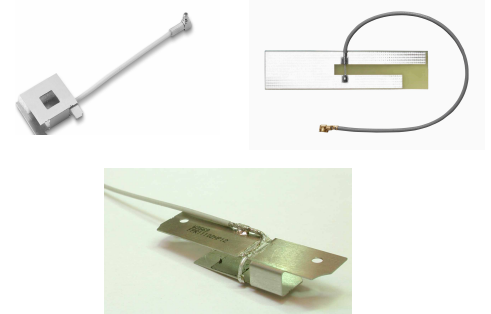
WLAN Solutions

Internal Solutions

When a customer chooses to integrate an antenna inside a product, the antenna choice immediately becomes more complex. The performance of the antenna can no longer be measured as an isolated component because the product packaging and antenna location inside affect the end performance. Pulse is committed to partnership for internal antenna designs to find optimal solutions. Together we test mechanical construction and identify the correct antenna platform, location and mechanical structure for the best performance. Several key antenna types are discussed below.

Cable Fed Antenna Solutions

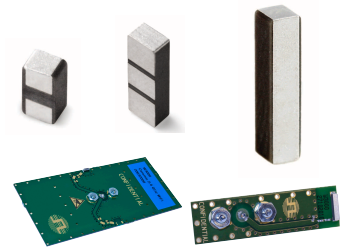
For designs with a high concentration of components on the main board, cable fed antennas are ideal as they take up less of the PCB area. They are located beside the main board or connected to the housing and connected back to the radio via a cable and board mounted connector. Flexible PCB material can be used to fit the antenna into non regular slots. Sheet metal, printed circuit board or a flexible radiator are the main types of radiator used. Connectors are at customer request, although IPEX or UFL and MMCX remain the most popular.



Board Mounted Antennas

Ceramics

Ceramic Antennas provide a very compact design where space is limited. They are an excellent choice in multi antenna systems where Isolation is a critical parameter. MIMO and Diversity applications are particularly successful using this type of antenna. Pulse boasts an unrivalled range of Ceramic block platforms offering solutions for PIFA and Monopole types, On Ground and Ground Cleared implementations as well as applications support for matching and tuning to final mechanics.



Sheet Metal

Sheet Metal is normally the lowest cost antenna form. Generally a certain amount of height is required, so these platforms are not the lowest profile antenna. The design needs to be fairly simple with straight edges making it is less suitable for complex mechanical structures. Sheet metal can be connected to the PCB using basic clips or a basic plastic mounting structure to make it THT or SMD.

Sheet Metal/Flex Radiator and Plastic Carrier

Moulding a sheet metal or flex radiator onto a plastic carrier can give a reliable and repeatable structure for volume production. Clips or mounts can be fixed into the plastic to fit the appropriate mechanical construction type, giving the option for integrating other functions such as speakers or microphones into the plastic carrier.



LDS Technology

Laser Direct Structuring (LDS) is the process by which the radiating element is lasered directly onto a plastic element. It is ideal for applications with very restricted space and complex mechanical structures. Connection method to the radio can be by clip or direct mounting, depending on the layout of the product. Pulse is currently supplying solutions using this technology in volume and can offer significant expertise in this area.

Worldwide Headquarters
12220 World Trade Drive
San Diego, CA 92128
USA
Tel 858 674 8100
Fax 858 674 8262

Larsen Brand Antennas
3611 NE 112th Avenue
Vancouver, WA 98682
USA
Tel 360 944 7551
800-268 3662 (USA)
Fax 360 944 7665
800 525 6749 (USA)

European Headquarters
Pulse GmbH & Co. KG
Zeppelinstrasse 15
Herrenberg
Germany
Tel +49 7032 7806 0
Fax +49 7032 7806 12

Asian Headquarters
B402, Shenzhen Academy of
Aerospace Tech Bldg
Tech-Innovation Internat'l
10th Kejianan Road
High Tech Zone
Nanshan District, Shenzhen
PR China
Tel 86 755 33966678
Fax 86 755 33966700

Pulse North Asia
3F, No. 198, Zhongyuan Rd
Zhongli City (32068)
Taoyuan Hsien
Taiwan (R.O.C.)
Tel 886 3 4356768
Fax 886 3 4356823

**Pulse (Suzhou) Wireless
Products Co, Ltd**
#99 Huo Ju Road
(#29 Bldg, 4th Phase)
Suzhou New District
Science & Tech Industrial Park
Jiangsu Province
Suzhou 215009 PR China
Tel 86 512 6807 9998
Fax 86 512 6809 8023