Logitech, Inc.
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(10) Antenna Info for DZLS00112

a) Per FCC 15.203, the antenna is internal and permanently attached. It is not intended to be serviced by the customer and is, therefore only serviceable by Logitech, Inc. authorized personnel.

(b) See the attached datasheet for more information.

Model	Ethertronics 1000146
Gain	3dBi @ 2.4GHz band
	4dBi @ 5GHz band(s)
Description	Dual-band proprietary antenna

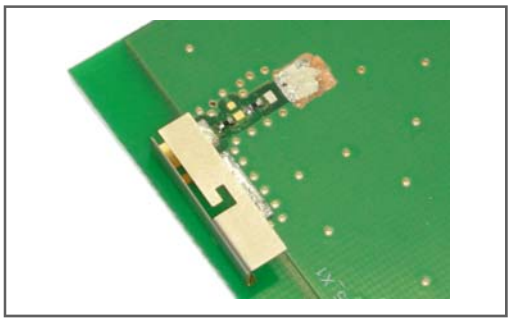
ethertronics
shaping antenna technology™

PRODUCT: WLAN

Part No. 1000146

Prestta™ WLAN Embedded Antenna

2.4/4.9/5.2/5.8 GHz (802.11 a/b/g/n + Japan)



Ethertronics' Prestta series of Isolated Magnetic Dipole™ (IMD) stamped metal antennas address the challenges facing today's product designers. IMD's high performance and isolation characteristics offer better connectivity and minimal interference. IMD antennas can be used in a variety of devices:

- Notebook Computers
- Access Points
- Industrial Handhelds
- Mobile Phones

TECHNOLOGY ADVANTAGES

Stays in Tune

IMD antenna technology provides superior RF field containment, resulting in less interaction with surrounding components. Ethertronics IMD antennas **resist de-tuning**; providing a robust radio link regardless of the usage position.

The patented IMD technology can be utilized in a variety of form factors, ranging from single to quad-band stamped metal antennas to compact, yet high performance ceramics. IMD antennas requires a smaller design keep-out area, carry lower program development risk which yields a quicker time-to-market, without sacrificing RF performance.

KEY BENEFITS

DESIGN ADVANTAGES

Quicker Time-to-Market

- By optimizing antenna size, performance and emissions, customer and regulatory specifications are more easily met.

Greater Flexibility

- Ethertronics' first-in-class IMD technology enables you to develop concept designs that are more advanced and that deliver superior performance in reception-critical GPS/WiFi applications.

RoHS Compliant

- Ethertronics' antennas are fully compliant with the European RoHS Directive 2002/95/EC.

END USER ADVANTAGES

Unique Form Factors Support Advanced Industrial Designs

- Smaller, more efficient IMD embedded antennas break through restrictive design rules and provide new freedom in component placement.

Superior Range & Signal Strength

- Better antenna function means longer range and greater sensitivity to critically precise signals— delivering greater customer satisfaction while building brand loyalty.

Faster Acquistion Times and Data Rates

- Improved performance provides faster data rates for downloading e-mail or surfing the internet and watching mobile video. Improved performance also means faster signal acquisition times so users can utilize GPS applications more quickly and reliably.

SERVICE AND SUPPORT

Extensive RF Experience

- Our design teams are composed of RF PhDs, project managers and a complete engineering team to support every project — from initial prototyping to TIS and TRP performance testing.

Global Operations & Design Support

- Ethertronics' global operations supports an integrated network of design centers that can take projects from concept to production.

ETHERTRONICS
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PRODUCT: WLAN a/b/g/n + Japan

Ethertronics' Internal (Embedded) Antenna Specifications.

Ethertronics produces a wide variety of standard and custom antennas to meet user needs. Below are the typical specs for a WLAN application.

Electrical Specifications

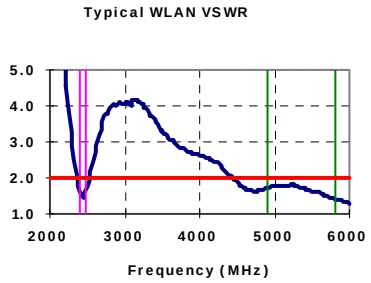
Typical Characteristics

WLAN a/b/g/n + Japan Antenna (GHz)	2.390-2.490	4.900-5.100	5.150-5.350	5.70-5.900
Peak Gain	3 dBi	4 dBi	4 dBi	4 dBi
Efficiency	65%	60%	55 %	45 %
VSWR Match	<2.1 : 1	<2.1 : 1	<2.1 : 1	<2.1 : 1
Front to Back Ratio	-2 dB	-10 dB	-10 dB	-10 dB
Feed Point Impedance	50 Ω unbalanced (other if required)			

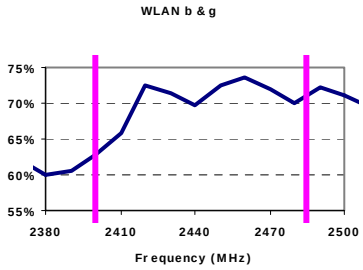
Mechanical Specifications

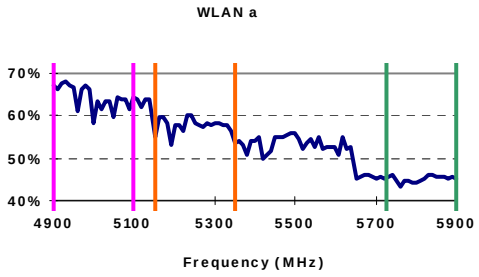
Dimensions	17.9 mm x 6.9 mm x 4.3 mm
Weight / Packaging	0.3 g
Cable / Connector	Optional — Hirose Electric Co, U.FL-LP-088 or equivalent
Cable Length	Surface Mount standard configuration, 450mm cable length optional

VSWR

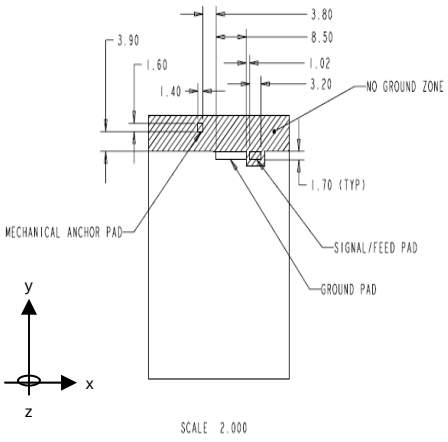


Efficiencies





Antenna PCB Ground/Feed Layout



Notes:
1. PCB size is a representative sample and able to be modified to specific requirements.
2. No Ground Zone: The shaded area is to be free of any ground plane on all layers.
3. All dimensions are in mm.

Antenna Radiation Patterns

Typical Performance