

**Savvi™ Embedded Ceramic Antennas**  
WiFi/ISM/BT/Zigbee  
2.4GHz



Ethertronics' Savvi series of Isolated Magnetic Dipole™ (IMD) antennas deliver on the key needs of device designers for higher functionality and performance in smaller/thinner designs. These innovative antennas provide compelling advantages for Bluetooth® enabled cell phones, media players and other mobile devices.

**TECHNOLOGY ADVANTAGES**

**Real-World Performance and Implementation**

Ceramic antennas may look alike on the outside, but the important difference is inside. Other antennas may contain simple PiFA or monopole designs that interact with their surroundings, complicating layout or changing performance with use position. Ethertronics' antennas utilize patented IMD technology to deliver a unique size and performance combination.



**Stays in Tune**

High RF isolation means IMD antennas resist de-tuning regardless of usage position. And one standardized part can typically be placed in a variety of locations.

**Smallest Effective Size**

IMD antennas require a smaller keep-out area for surrounding components, leading to a smaller effective size.

**High Performance**

IMD's high efficiency and simple design rules lower development risk and speed time-to-market without sacrificing performance. Plus, high RF selectivity eliminates the cost and space for band-pass circuitry.

More information is available on our Website at [www.ethertronics.com/resources/](http://www.ethertronics.com/resources/).



**KEY BENEFITS**

**DESIGN ADVANTAGES**

**Best in Class Performance—Smallest Occupied Volume**

- Powerful combination of 76% peak efficiency and simple implementation guidelines.
- Minimal ground clearance and component “keep out” areas. Very low component height.
- High selectivity eliminates the cost for additional filters and frees up board space

**High Tolerance to Frequency Shifts**

- IMD's high RF isolation resists antenna de-tuning that otherwise impair reception.
- Single part works for various PCB sizes and layouts.

**Quicker Time-to-Market**

- Fewer design modifications required to pass RF test suite.

**RoHS Compliant**

- Ethertronics' antennas comply with the European RoHS Directive 2002/95/EC.

**END USER ADVANTAGES**

**Superior Range**

- Greater antenna efficiency means longer range and a better end user experience.

**Exceptional Coverage**

- Better coverage delivers more reliable wireless connections for mobile phones, laptops, stereo headsets, cars, media players, audio systems and more.

**SERVICE AND SUPPORT**

**Extensive RF Experience**

- Our Savvi ceramic antennas are supported by extensive application notes, and when needed, by the expertise of RF engineers who have integrated hundreds of antenna designs into wireless devices.

**Global Operations & Design Support**

- Ethertronics' global operations encompass an integrated network of design centers that provide local customer support.

**PRODUCT: Embedded 2.4GHz LTCC Antenna - M310210 and M310210-1K**

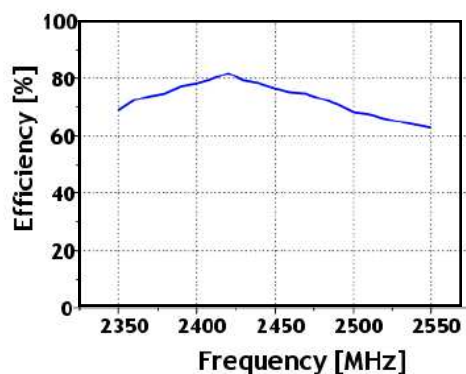
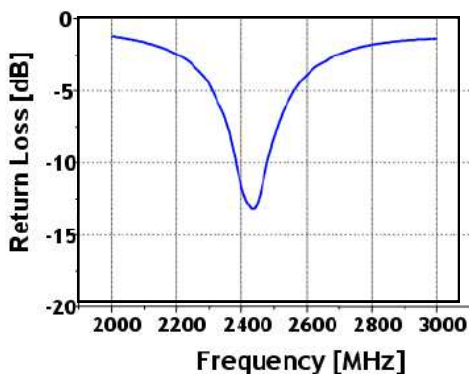
**Ethertronics' Savvi™ Embedded Antenna Specifications**

Ethertronics produces a wide variety of standard and custom antennas to meet user needs. Below are the typical performances.

Electrical Specifications Typical Characteristics (Inside an enclosure)	2.400–2.480 GHz	
	Peak Gain	-1.3 dBi
Average Efficiency	75%	
VSWR Match	1.02:1 max	
Feed Point Impedance	50 ohms unbalanced	
Power Handling	0.5 Watt CW	
Polarization	Linear	

Mechanical Specifications	2.400–2.480 GHz	
	Size	3.00x1.50x1.08mm
Mounting	Surface mount	
Weight	0.1 g	
Packaging	Tape & Reel M310210: Minimum Order Quantity of 100,000 pcs. Order multiples of 10,000 pcs. M310210-1K: Minimum Order Quantity of 1,000 pcs. Order multiples of 1,000 pcs.	

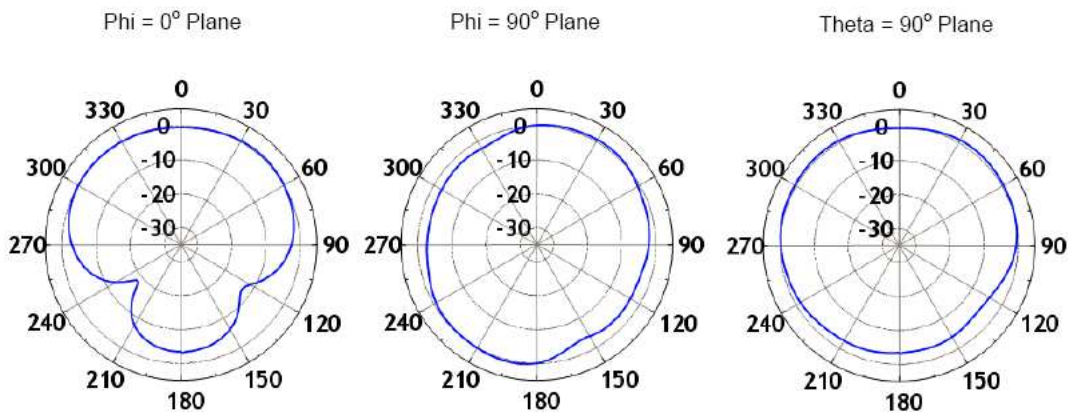
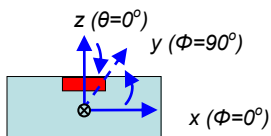
**Typical Efficiency, Return Loss**



**Antenna Radiation Patterns**

**2.440 GHz Band**

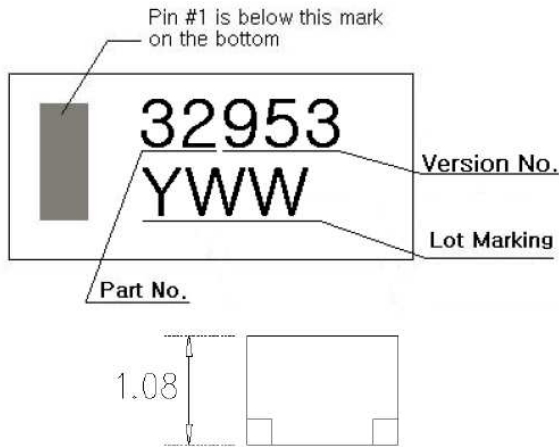
Typical Performance  
Ethertronics' Test Board  
PCB: 40x60mm



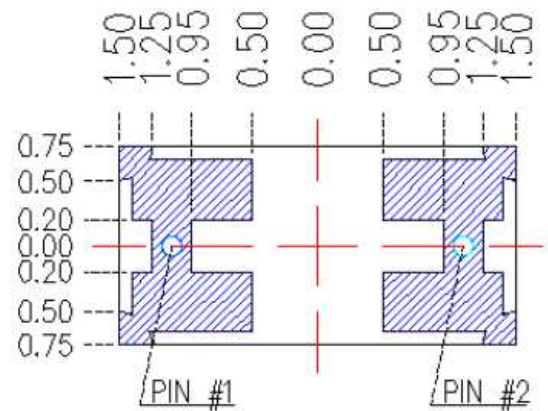
**PRODUCT: Embedded 2.4GHz LTCC Antenna - M310210 and M310210-1K**

To optimize product designs using Ethertronics Savvi™ Bluetooth single band antenna, the PCB should use the recommended land pattern shown in the Figures below. The land patterns are composed of a 50 ohm line connected to each antenna feed point (1 ground, 1 ground/feed, see Application Note for more information). Ground clearance around and under the antenna, as shown in the PCB layout below, is recommended in order to maximize the antenna's performance. The antenna should be located along an edge of the PCB.

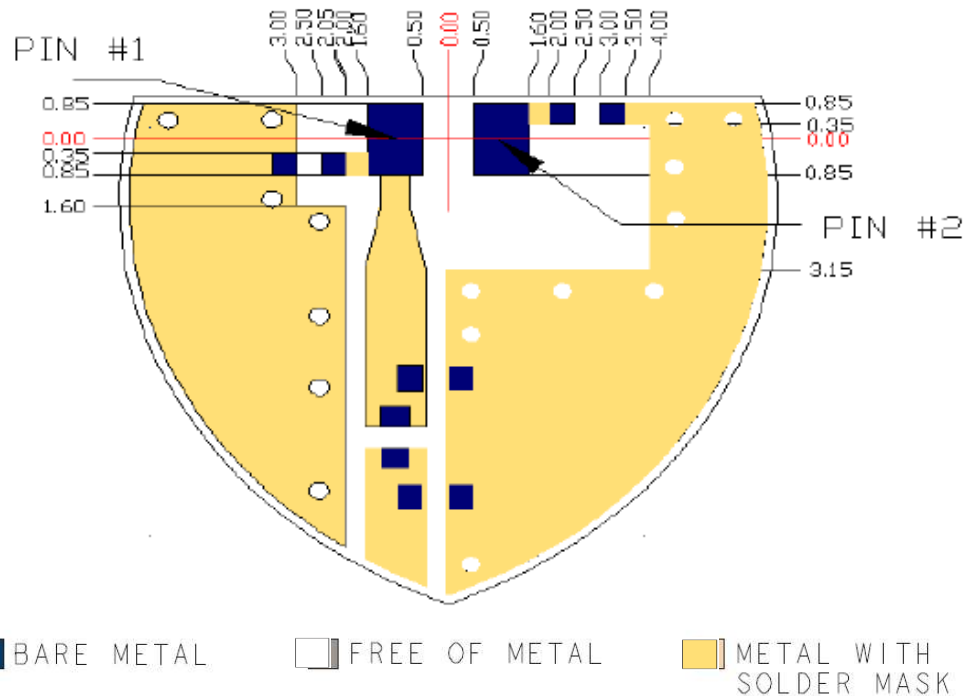
**Antenna Pad Layout**



Pin	Description
1	Ground/ Bluetooth Feed*
2	Ground



**PCB Layout**



Please contact Ethertronics for product sampling information.