

Part No. 1001011

GPS/GLONASS/Beidou/Galileo (On/Off Ground) or ISM FR4 Antenna

1.561, 1.575, 1.603 GHz or 868-928 MHz

Supports: Tracking, Smart Home, Agriculture, Automotive, Healthcare, Digital Signage, Wearables, Industrial Devices



*ISM layout offered in Appendix 1

GPS / GLONASS / Beidou / Galileo FR4 Antenna

1.559 – 1.610 GHz or
ISM 868 – 928 MHz

KEY BENEFITS

Stay-in-Tune

IMD antenna technology provides superior RF field containment, resulting in less interaction with surrounding components.

Quicker Time-to-Market

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

Reliability

Products are the latest RoHS version compliant.

APPLICATIONS

- Embedded design
- Cellular, Headsets, Tablets
- Gateway, Access Point
- Handheld
- Telematics
- Tracking
- Healthcare
- M2M, Industrial devices
- Smart Grid
- OBD-II

Real-World Performance and Implementation

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 Isolated Magnetic Dipole (IMD) technology to deliver a unique size and performance combination.

Greater Flexibility

Ethertronics' IMD technology enables the advance antenna design that delivers superior performance in reception critical applications. 1001011 is capable for off-ground and on-ground (over metal) environments. The 1001011 can also achieve ISM performance with proper layout shown on Appendix 1.

Electrical Specifications

Typical Characteristics, on 72 x 50 mm PCB

| Frequency (GHz) | 1.559 - 1.563 | 1.575 | 1.559 - 1.591 | 1.593 - 1.610 | *868 – 928 MHz |
|---------------------------------------|------------------------|--------------|---------------|---------------|---------------------|
| Mounting | Off Ground / On Ground | | | | Off Ground |
| GNSS Bands | Beidou | GPS | Galileo | Glomass | Refer to Appendix 1 |
| Peak Gain (dBi) | 0.96 / -0.26 | 0.87 / -0.22 | 0.96 / -0.18 | 1.00 / -0.35 | |
| Efficiency (%) | 72 / 47 | 71 / 46 | 70 / 45 | 69 / 41 | |
| Center Frequency f ₀ (GHz) | 1.561 | 1.575 | 1.575 | 1.603 | |
| VSWR | 1.5:1 / 2.5:1 | | | | |
| Feed Point Impedance | 50 Ω unbalanced | | | | |

Mechanical Specifications & Ordering Part Number

| Ordering Part Number | 1001011 |
|----------------------|------------------------------|
| Size (mm) | 22.0 x 3.2 x 3.3 |
| Mounting | Surface mounted to the PCB |
| Weight (grams) | 0.45 |
| Packaging | Tape & Reel |
| Demo Board | 1001011-02 (GNSS Demo Board) |
| | 1001011-04 (ISM Demo Board) |

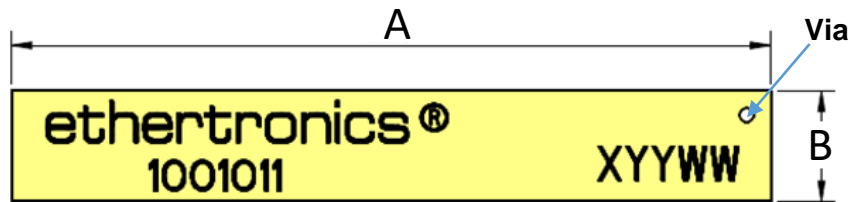
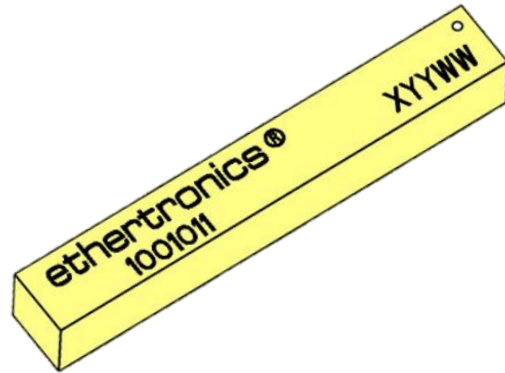


1.575 GHz Ethertronics' Embedded Antenna Specifications.
Ethertronics produces a wide variety of standard and custom antennas to meet user needs.

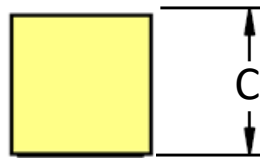
Antenna Dimensions

Typical antenna dimensions (mm)

| Part Number | A (mm) | B (mm) | C (mm) |
|-------------|------------|-----------|-----------|
| 1001011 | 22.0 ± 0.3 | 3.2 ± 0.2 | 3.3 ± 0.3 |



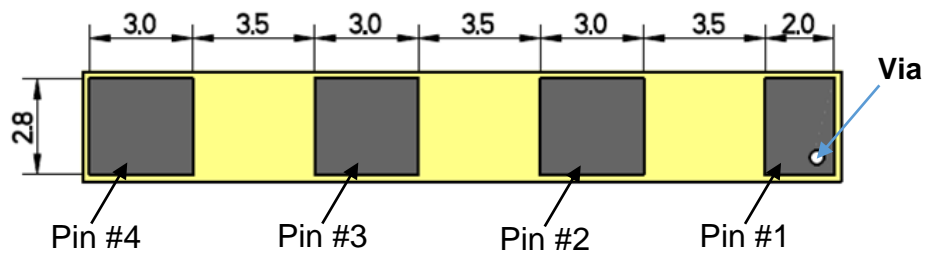
Top View



Height

Pin Descriptions

| Pin# | Description |
|------|-------------|
| 1 | Feed |
| 2 | Dummy Pad |
| 3 | Dummy Pad |
| 4 | Dummy Pad |



Bottom View

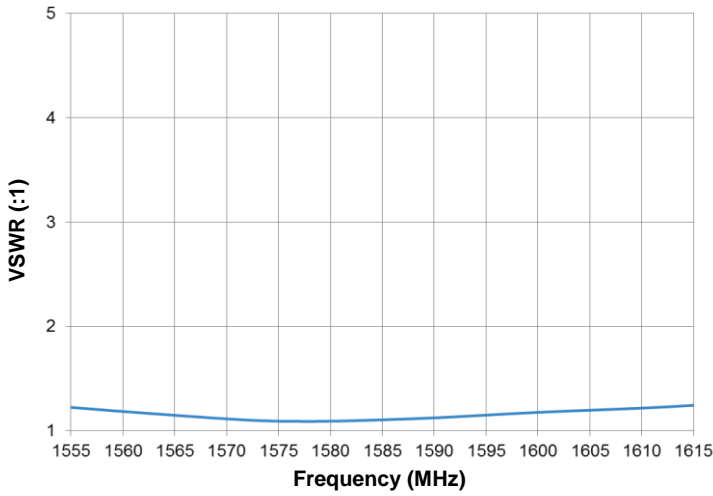


1.575 GHz Ethertronics' Embedded Antenna Specifications.
Ethertronics produces a wide variety of standard and custom antennas to meet user needs.

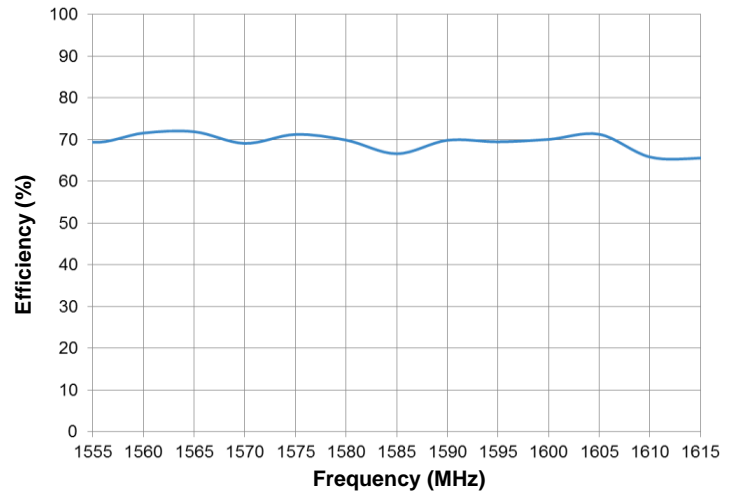
VSWR and Efficiency Plots (Off-Ground)

Typical Performances on 72 x 50 mm PCB

VSWR

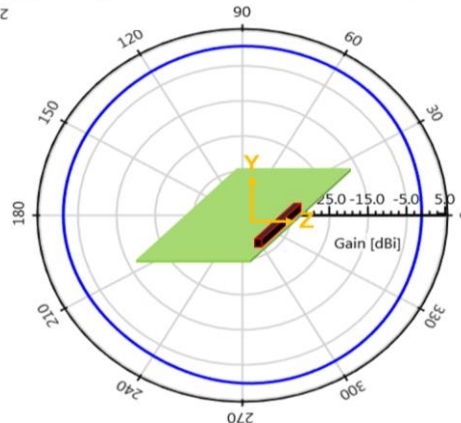
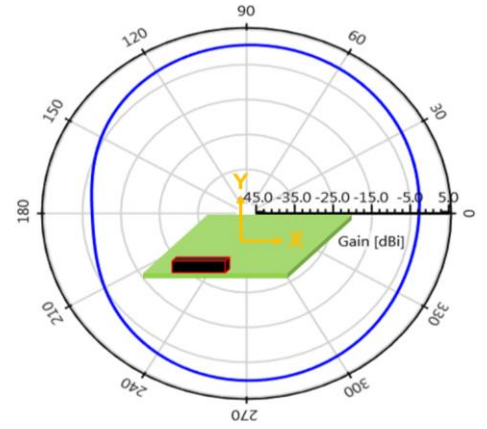
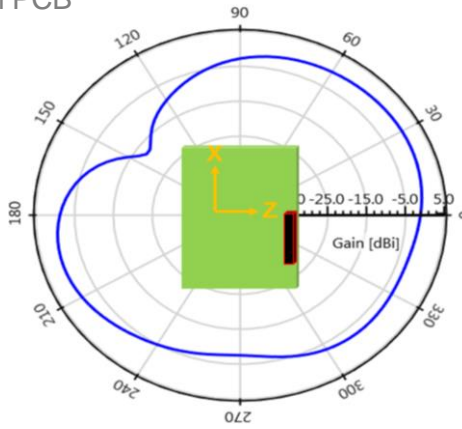


Efficiency



Antenna Radiation Patterns (Off-Ground)

Typical Performances on 72 x 50 mm PCB
measured @ 1.575 GHz

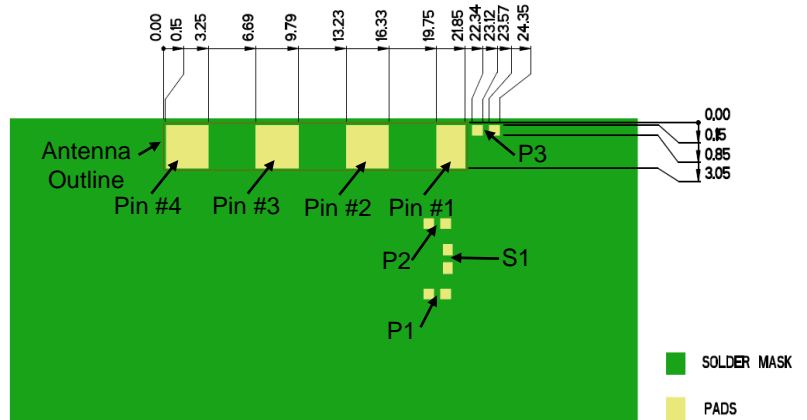
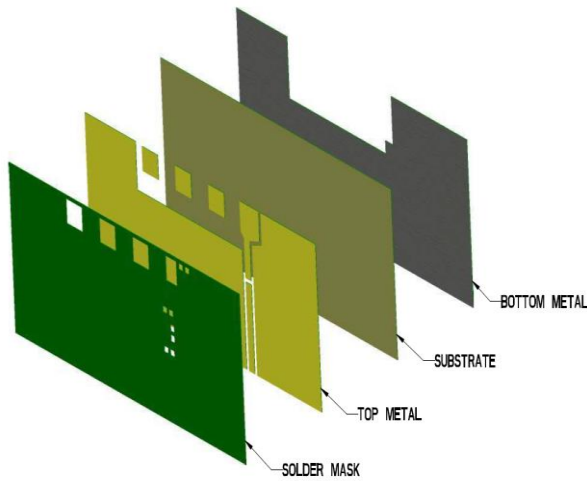




1.575 GHz Ethertronics' Embedded Antenna Specifications.
Ethertronics produces a wide variety of standard and custom antennas to meet user needs.

Antenna Layout (Off-Ground)

Typical layout dimensions (mm)



* VIAS: Diam. 0.2mm, (no vias on transmission lines).
Via holes must be covered by solder mask

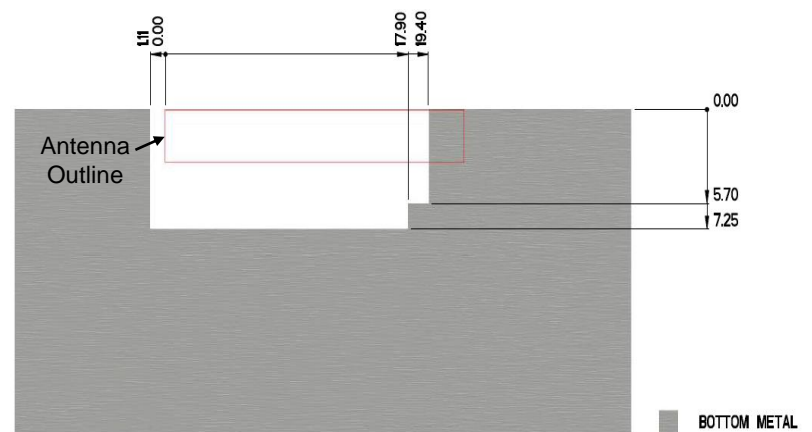
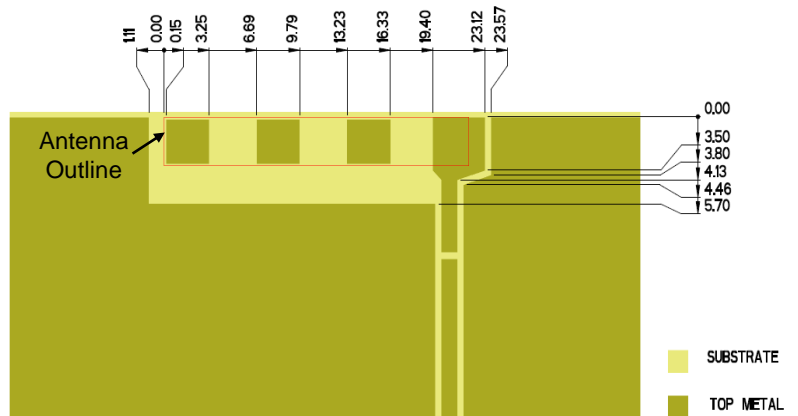
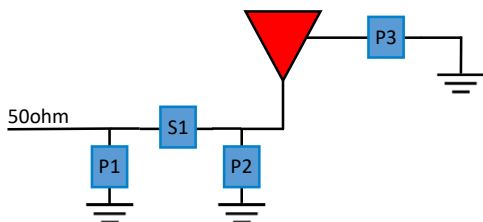
Pin Descriptions

| Pin# | Description |
|------|-------------|
| 1 | Feed |
| 2 | Dummy Pad |
| 3 | Dummy Pad |
| 4 | Dummy Pad |

Matching Pi Network (Demo Board)

| Component | Value | Tolerance |
|-----------|-------|-----------|
| P1 | DNI | N/A |
| S1 | 4.3pF | ±0.25pF |
| P2 | 1pF | ±0.5pF |
| P3 | 0Ω | N/A |

*Actual matching values depend on customer design



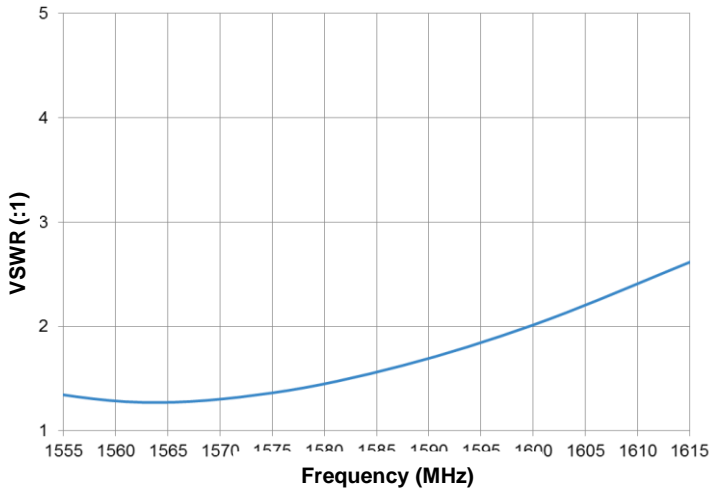


1.575 GHz Ethertronics' Embedded Antenna Specifications.
Ethertronics produces a wide variety of standard and custom antennas to meet user needs.

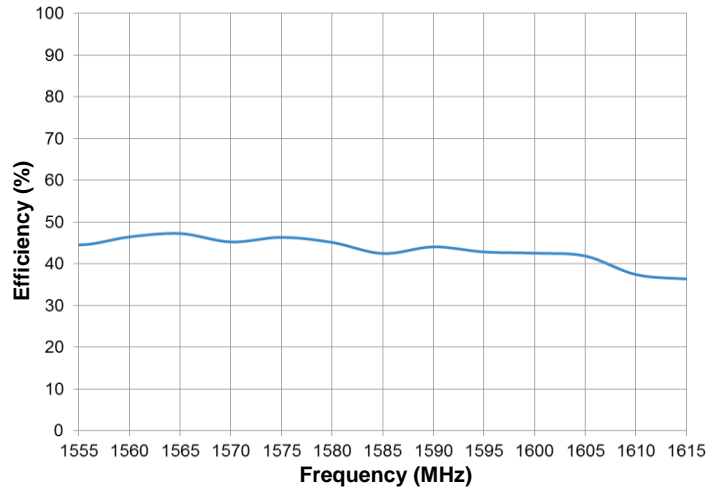
VSWR and Efficiency Plots (On-Ground)

Typical Performances on 72 x 50 mm PCB

VSWR

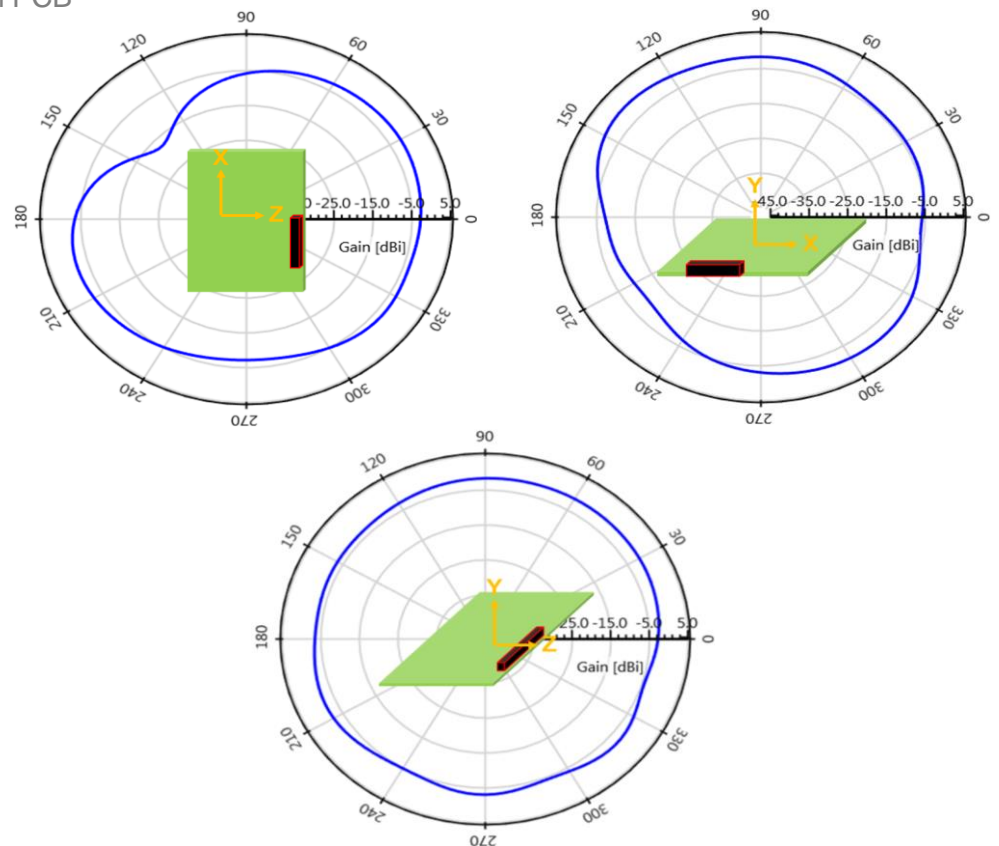


Efficiency



Antenna Radiation Patterns (On-Ground)

Typical Performances on 50 x 72 mm PCB
measured @ 1.575 GHz

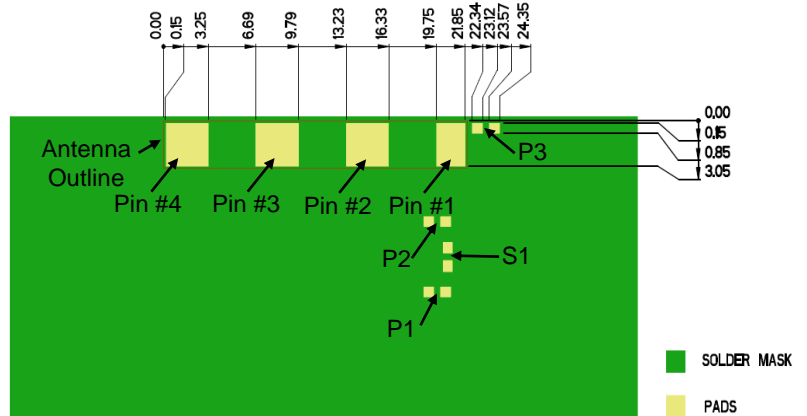
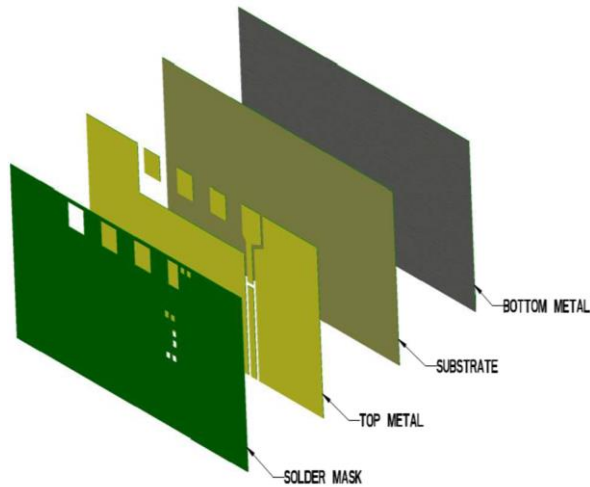




1.575 GHz Ethertronics' Embedded Antenna Specifications.
Ethertronics produces a wide variety of standard and custom antennas to meet user needs.

Antenna Layout (On-Ground)

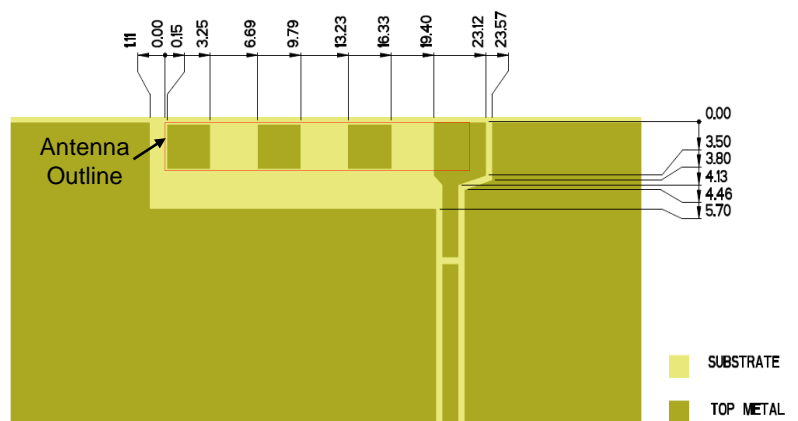
Typical layout dimensions (mm)



* VIAS: Diam. 0.2mm, (no vias on transmission lines).
Via holes must be covered by solder mask

Pin Descriptions

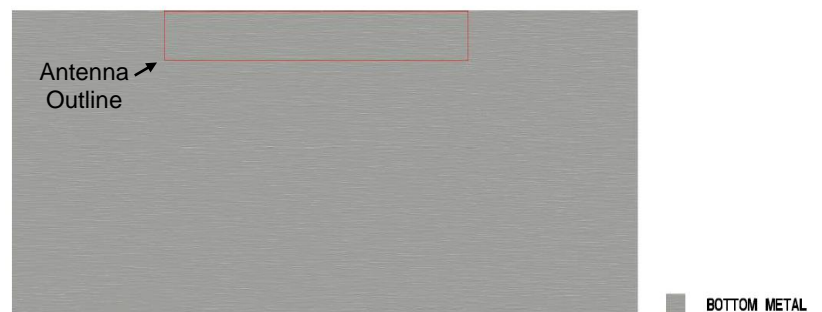
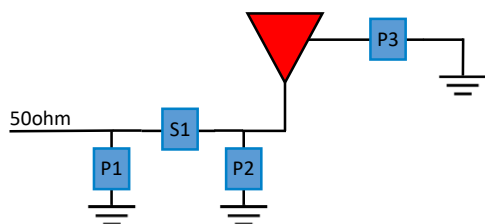
| Pin# | Description |
|------|-------------|
| 1 | Feed |
| 2 | Dummy Pad |
| 3 | Dummy Pad |
| 4 | Dummy Pad |



Matching Pi Network (Demo Board)

| Component | Value | Tolerance |
|-----------|-------|-----------|
| P1 | 2.4pF | ±0.1pF |
| S1 | 0Ω | N/A |
| P2 | DNI | N/A |
| P3 | 0Ω | N/A |

*Actual matching values depend on customer design

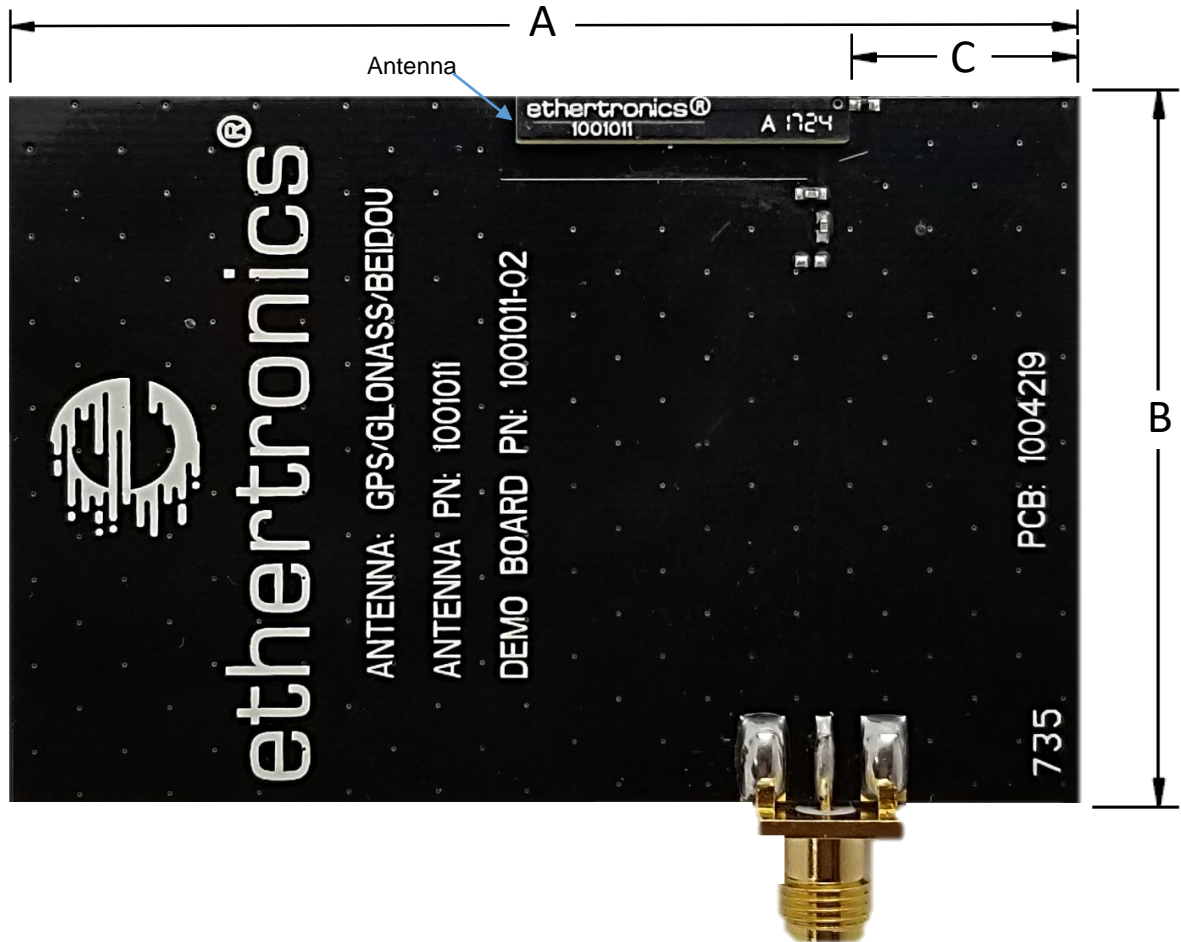




1.575 GHz Ethertronics' Embedded Antenna Specifications.
Ethertronics produces a wide variety of standard and custom antennas to meet user needs.

Antenna Demo Board
1001011-02 Off-Ground

| Part Number | A (mm) | B (mm) | C (mm) |
|-------------|--------|--------|--------|
| 1001011-02 | 72.0 | 50.0 | 15.0 |





Appendix 1 ISM Ethertronics' Embedded Antenna Specifications.
Ethertronics produces a wide variety of standard and custom antennas to meet user needs.

Appendix 1

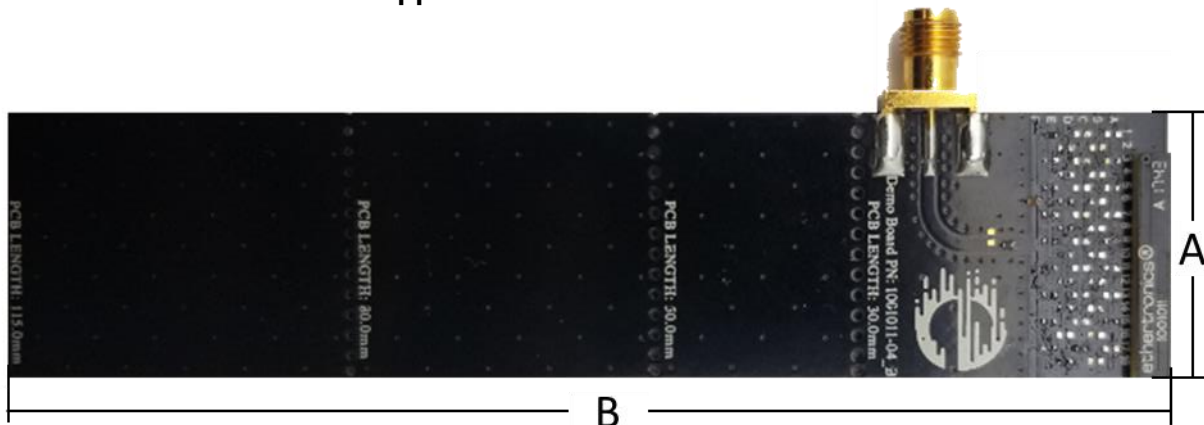
Appendix 1 gives instructions on how to match antenna through impedance matching network for ISM (868-928 MHz) only.

| Frequency (MHz) | 868 - 928 |
|----------------------|-----------------|
| Mounting | Off Ground |
| Peak Gain (dBi) | 1.0 |
| Efficiency (%) | 64 |
| VSWR | <2.5:1 |
| Feed Point Impedance | 50 Ω unbalanced |

*Data shown above has Appendix 1 matching applied on 115 x 26.5 mm pcb.

| Part Number | A (mm) | B (mm) |
|-------------|--------|--------|
| 1001011-04 | 26.5 | 115.0 |

***Appendix 1 Antenna Demo Board**

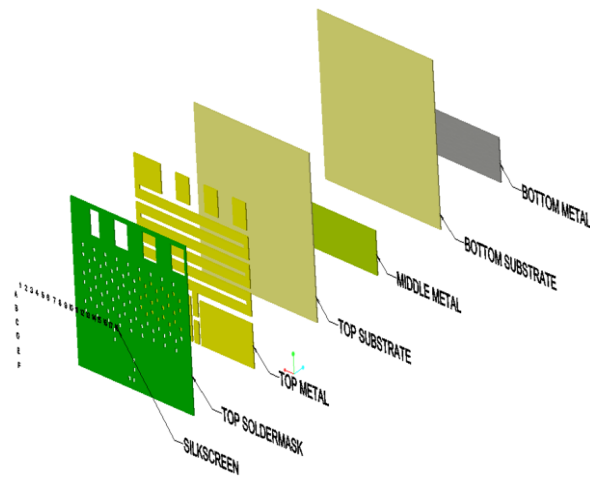




Appendix 1 ISM Ethertronics' Embedded Antenna Specifications.
Ethertronics produces a wide variety of standard and custom antennas to meet user needs.

Appendix 1 ISM Antenna Layout (Off-Ground)

Typical layout dimensions (mm)



* VIAS: Diam. 0.2mm, (no vias on transmission lines).
Via holes must be covered by solder mask

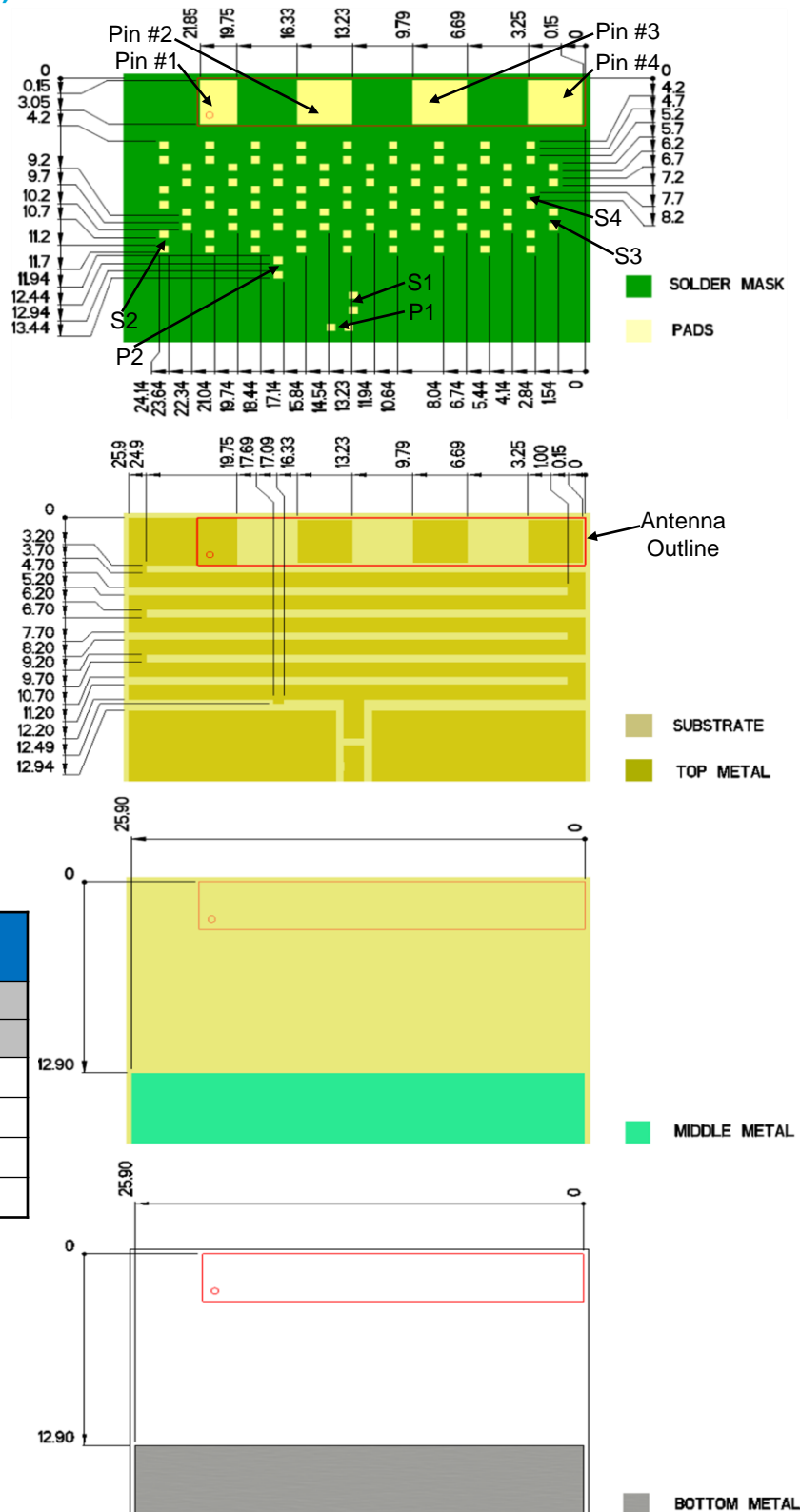
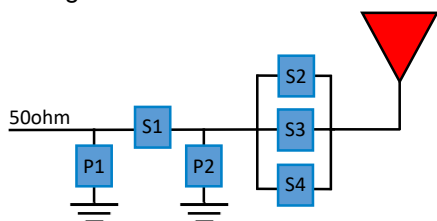
Pin Descriptions

| Pin# | Description |
|------|-------------|
| 1 | Feed |
| 2 | Dummy Pad |
| 3 | Dummy Pad |
| 4 | Dummy Pad |

Matching Pi Network (Demo Board)

| Component | Value | Tolerance | Board Label |
|-----------|-------|-----------|-------------|
| P1 | DNI | N/A | |
| S1 | 0Ω | N/A | |
| P2 | 18nH | ±2% | F6 |
| S2 | 0Ω | N/A | E1 |
| S3 | 0Ω | N/A | D18 |
| S4 | DNI | N/A | C17 |

*Actual matching values depend on customer design





Appendix 1 ISM Ethertronics' Embedded Antenna Specifications.
Ethertronics produces a wide variety of standard and custom antennas to meet user needs.

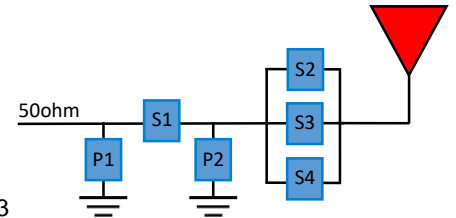
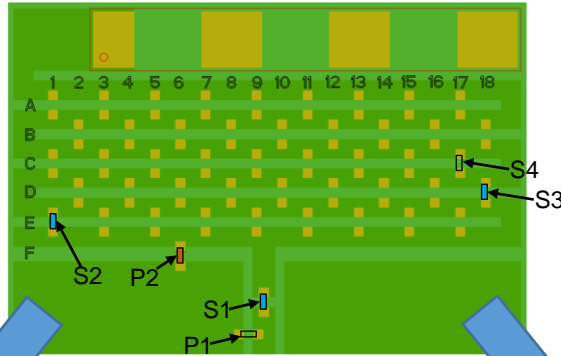
Appendix 1 ISM Tuning Structure (Off-Ground)

Typical layout dimensions (mm)

Baseline Configuration

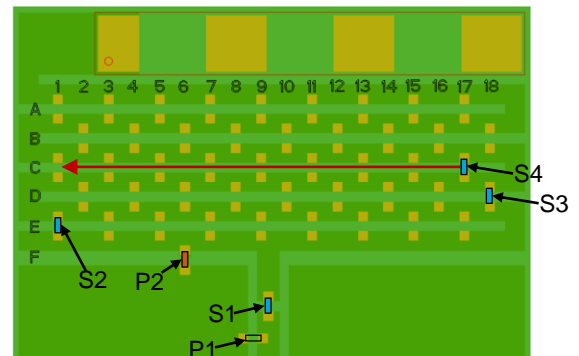
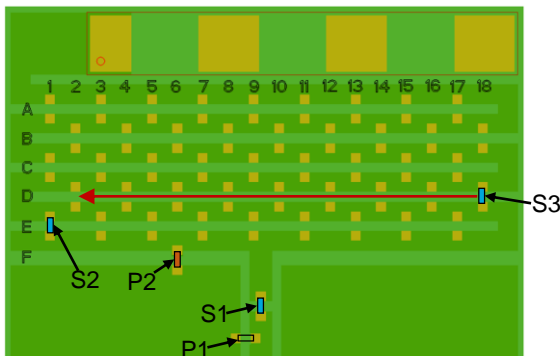
| Component | Value | Tolerance | Board Label |
|-----------|-------|-----------|-------------|
| P1 | DNI | N/A | |
| S1 | 0Ω | N/A | |
| P2 | 18nH | ±2% | F6 |
| S2 | 0Ω | N/A | E1 |
| S3 | 0Ω | N/A | D18 |
| S4 | DNI | N/A | C17 |

*Matching Pi Network (Baseline)



| Tune Frequency <u>Lower?</u> | Outcome: |
|--|---|
| Move (S3) 0 Ohm from D18 towards D2 depending on requested antenna tuning. D18, D16, and D14 through D2 allows for on board tuning to shift frequency lower. | Antenna frequency will shift lower up to D2 tuning location |

| Tune Frequency <u>Higher?</u> | Outcome: |
|---|--|
| Keep (S3) 0 Ohm on D18. Add (S4) 0 Ohm on C17 to shift resonant frequency slightly higher. Continue to move C17 component towards C1 for more drastic tuning. | Antenna frequency will shift higher up to C1 tuning location |



| Component | Value | Tolerance | Board Label |
|-----------|-----------|------------|---------------|
| P1 | DNI | N/A | |
| S1 | 0Ω | N/A | |
| P2 | 18nH | ±2% | F6 |
| S2 | 0Ω | N/A | E1 |
| S3 | 0Ω | N/A | D18-D2 |
| S4 | DNI | N/A | C17 |

| Component | Value | Tolerance | Board Label |
|-----------|-----------|------------|----------------|
| P1 | DNI | N/A | |
| S1 | 0Ω | N/A | |
| P2 | 18nH | ±2% | F6 |
| S2 | 0Ω | N/A | E1 |
| S3 | 0Ω | N/A | D18 |
| S4 | 0Ω | N/A | C17- C1 |

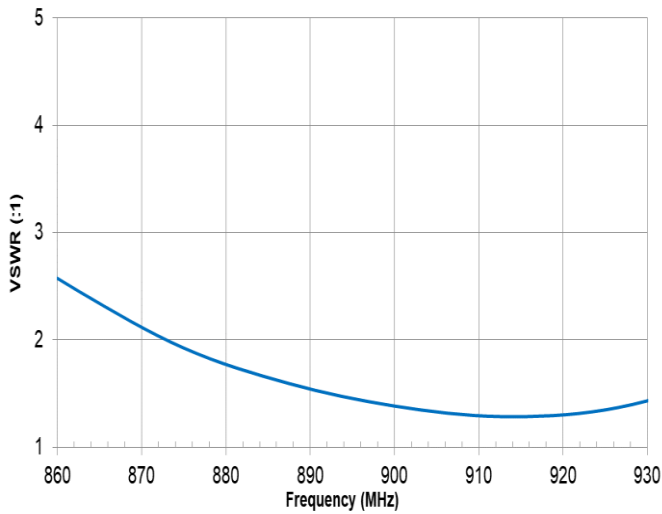


Appendix 1 ISM Ethertronics' Embedded Antenna Specifications.
Ethertronics produces a wide variety of standard and custom antennas to meet user needs.

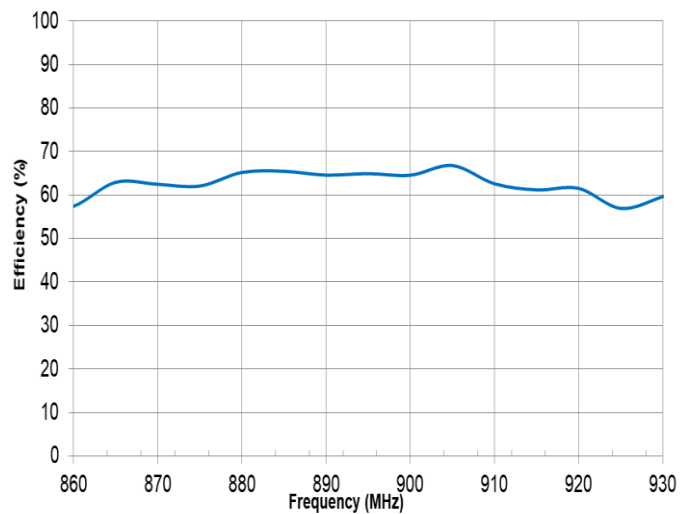
Appendix 1 VSWR and Efficiency Plots (Off-Ground)

Typical Performances on 115 x 26.5 mm PCB

VSWR



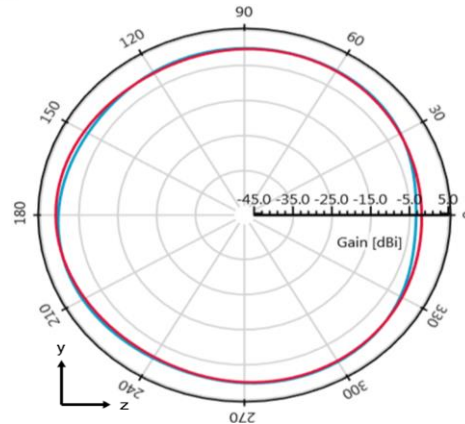
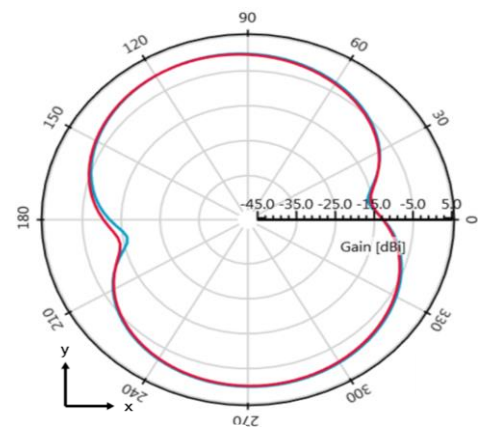
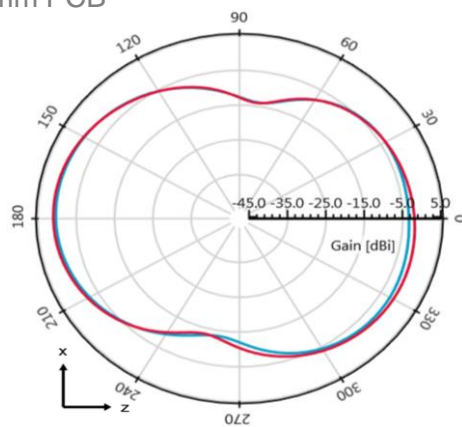
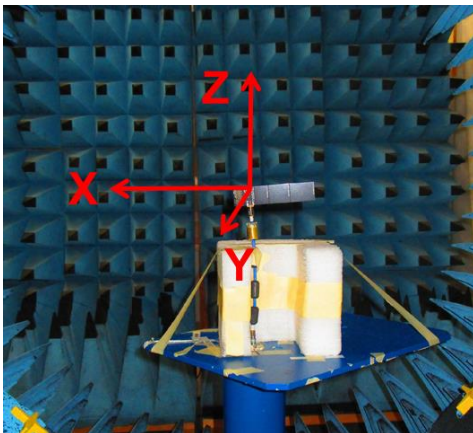
Efficiency



Antenna Radiation Patterns (Off-Ground)

Typical Performances on 115 x 26.5 mm PCB
measured @ 870, 910 MHz

- 870 MHz
- 910 MHz



Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[AVX:](#)

[1001011](#)