

# Part No. P522304 / 9000154

## Broadband FR4 Embedded Cellular Antenna

850 / 900 / 1800 / 1900 / 2100 MHz

Supports: Broadband LTE (OCTA-BAND), LTE CAT-M, NB-IoT, SigFox, LoRa, Cellular LPWA, RPMA, Firstnet



\*Mirrored version offered as 9000154

### Broadband FR4 Embedded Cellular Antenna

Low Band 824 – 960 MHz

High Band 1710 - 2170 MHz

#### KEY BENEFITS

##### Reduced Costs and Time-to-Market

Standard antenna eliminates design fees and cycle time associated with a custom solution; getting products to market faster.

##### Greater Flexibility with Unique Form Factors

Ethertronics' technology helps you deliver more advanced ergonomic designs without adverse impact on product performance.

##### Reliability

Comply with latest RoHS requirements

#### APPLICATIONS

- Medical applications
- Home automation
- Smart metering
- M2M, Industrial devices
- IoT
- Firstnet
- Automotive
- Healthcare
- Point of Sale
- Tracking
- Cellular
- 3G Systems

Ethertronics' Broadband Embedded Cellular antenna utilizes Isolated Magnetic Dipole™ (IMD) technology which address the challenges facing today's product designers. IMD's high performance and isolation characteristics offer better connectivity and minimal interference. Mirrored version variant offered as 9000154.

#### Stays in Tune

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

Ethertronics antennas use patented IMD technology in many antenna configurations to provide high performance. 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.

#### Electrical Specifications

Typical Characteristics, on 50 x 110 mm PCB

| Frequency            | 824 - 960 MHz      | 1710 - 2170 MHz |
|----------------------|--------------------|-----------------|
| Efficiency           | 62%                | 55%             |
| VSWR                 | 2.5:1 max          | 2.7:1 max       |
| Peak Gain            | 0 dBi              | 0.7 dBi         |
| Polarization         | Linear             |                 |
| Power Handling       | 2 Watts CW         |                 |
| Radiation Pattern    | Omni-directional   |                 |
| Feed Point Impedance | 50 ohms unbalanced |                 |

#### Mechanical Specifications & Ordering Part Number

| Ordering Part # | P522304                       |
|-----------------|-------------------------------|
| Dimensions (mm) | 35.0 x 9.0 x 3.2              |
| Weight (grams)  | 2.1                           |
| Mounting        | SMT (P&P)                     |
| Packaging       | 1,120 pcs/reel; 5,600 pcs/box |
| Demo Board      | P522304-02                    |

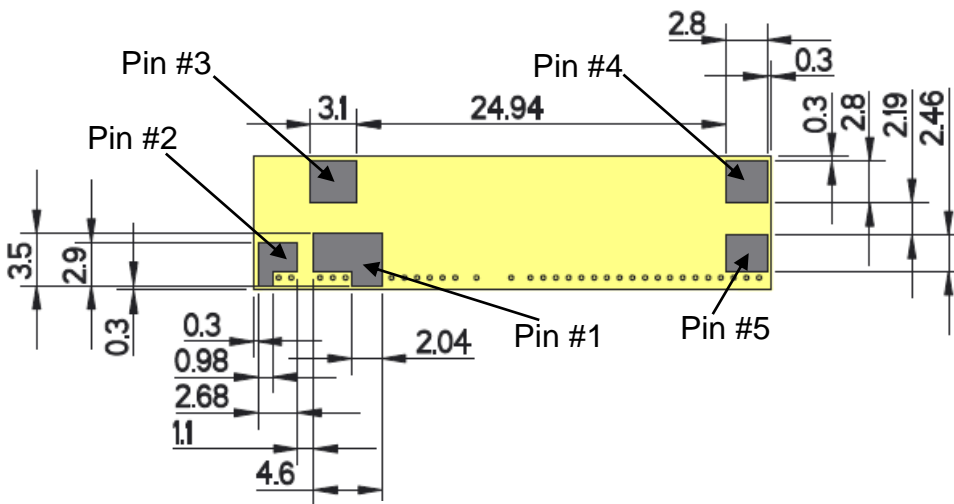
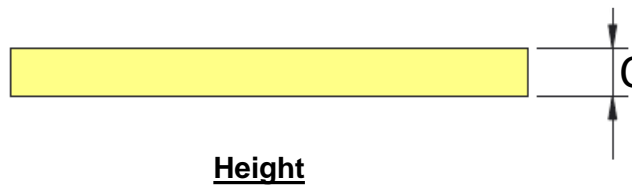
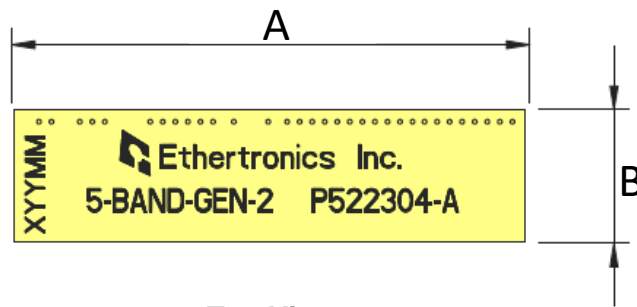


Cellular FR4 Ethertronics' Embedded Antenna Specifications.  
Ethertronics produces a wide variety of standard and custom antennas to meet user needs.

### Antenna Dimensions

Typical antenna dimensions (mm)

| Part Number | A (mm)     | B (mm)    | C (mm)    |
|-------------|------------|-----------|-----------|
| P522304     | 35.0 ± 0.3 | 9.0 ± 0.2 | 3.2 ± 0.3 |



### Pin Descriptions

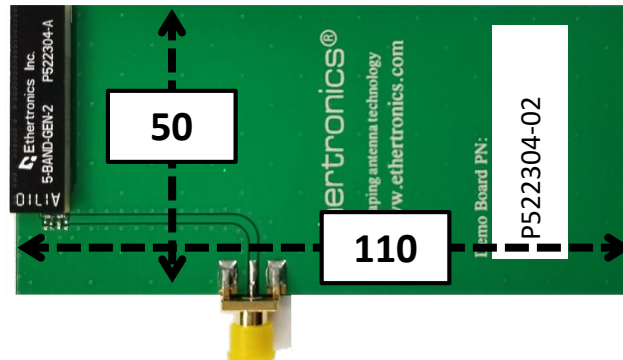
| Pin# | Description     |
|------|-----------------|
| 1    | Feed            |
| 2    | Ground          |
| 3    | Dummy Pad       |
| 4    | Dummy Pad       |
| 5    | Low Band Tuning |



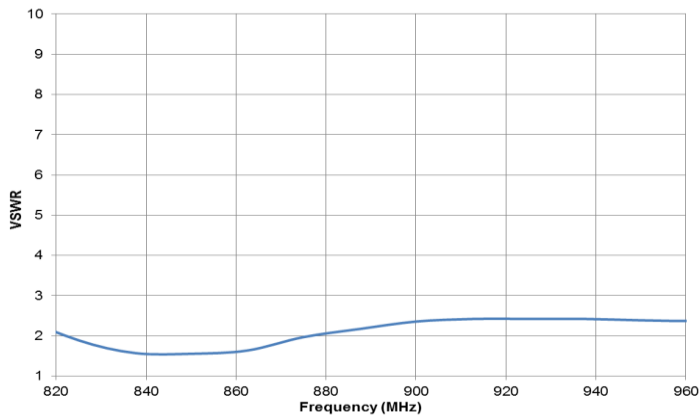
Cellular FR4 Ethertronics' Embedded Antenna Specifications.  
Ethertronics produces a wide variety of standard and custom antennas to meet user needs.

### VSWR and Efficiency Plots (Off-Ground)

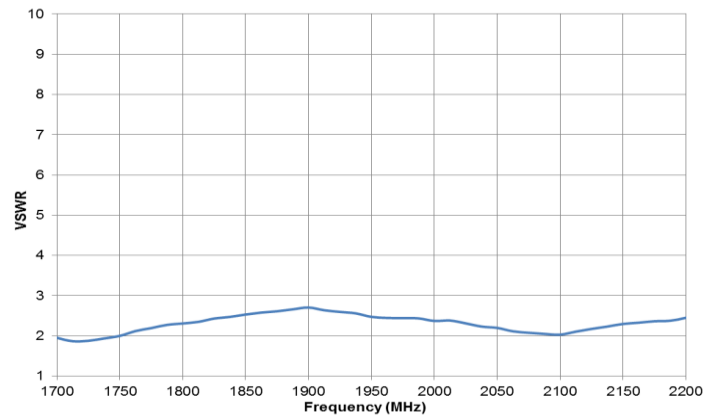
Typical Performance on 50 x 110 mm PCB



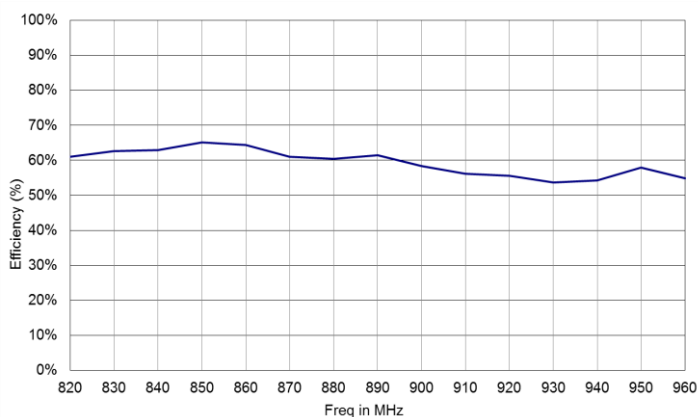
Low Band VSWR



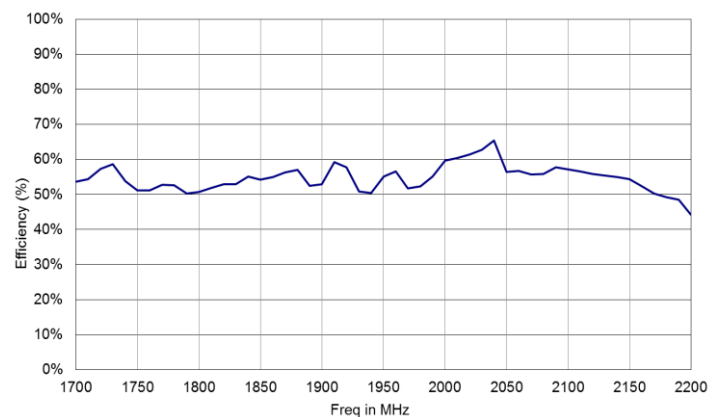
High Band VSWR



Low Band Efficiency



High Band Efficiency





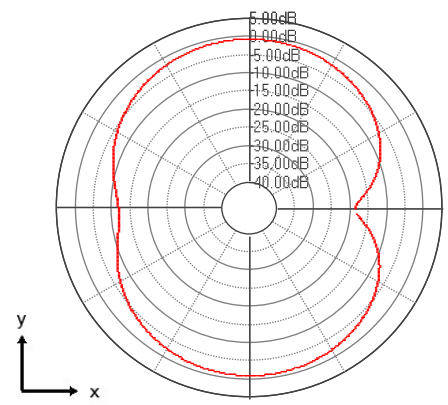
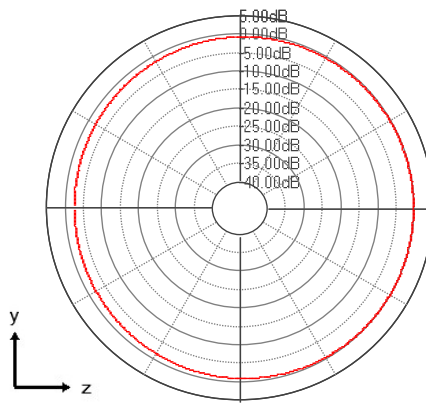
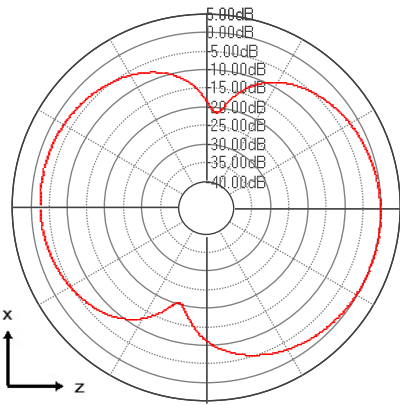
Cellular FR4 Ethertronics' Embedded Antenna Specifications.  
Ethertronics produces a wide variety of standard and custom antennas to meet user needs.

**Antenna Radiation Patterns**

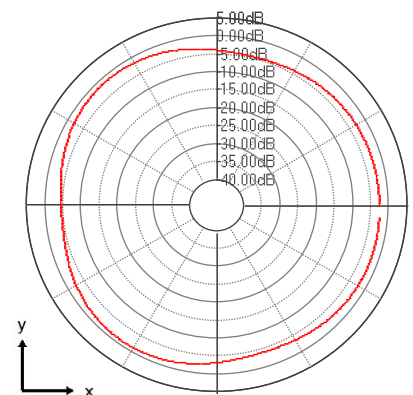
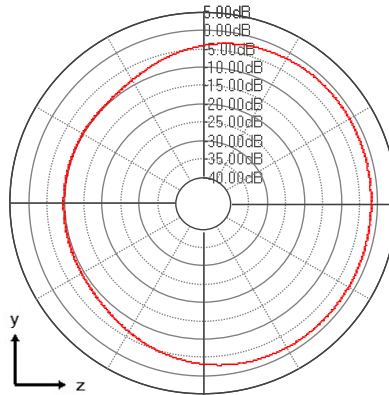
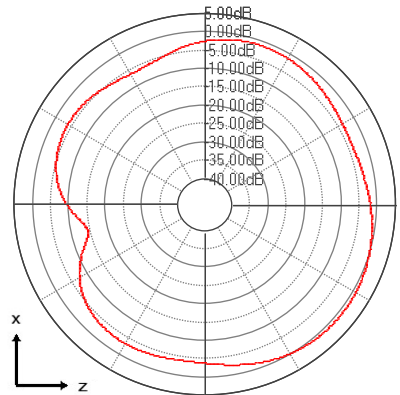
Typical Performance on 50 x 110 mm PCB  
Measured @ 910, 1870 MHz



Measured at 910 MHz



Measured at 1870 MHz

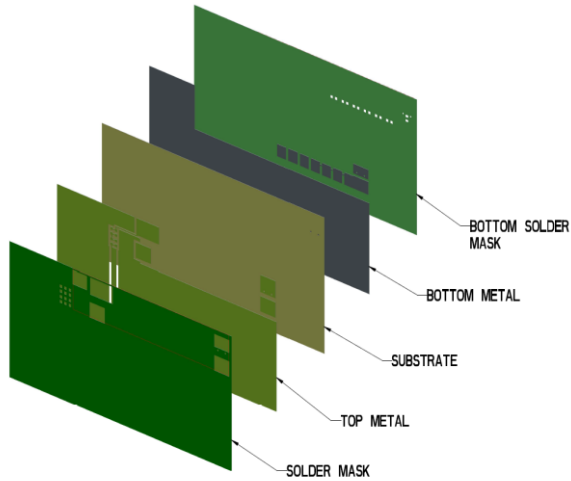




Cellular FR4 Ethertronics' Embedded Antenna Specifications.  
Ethertronics produces a wide variety of standard and custom antennas to meet user needs.

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

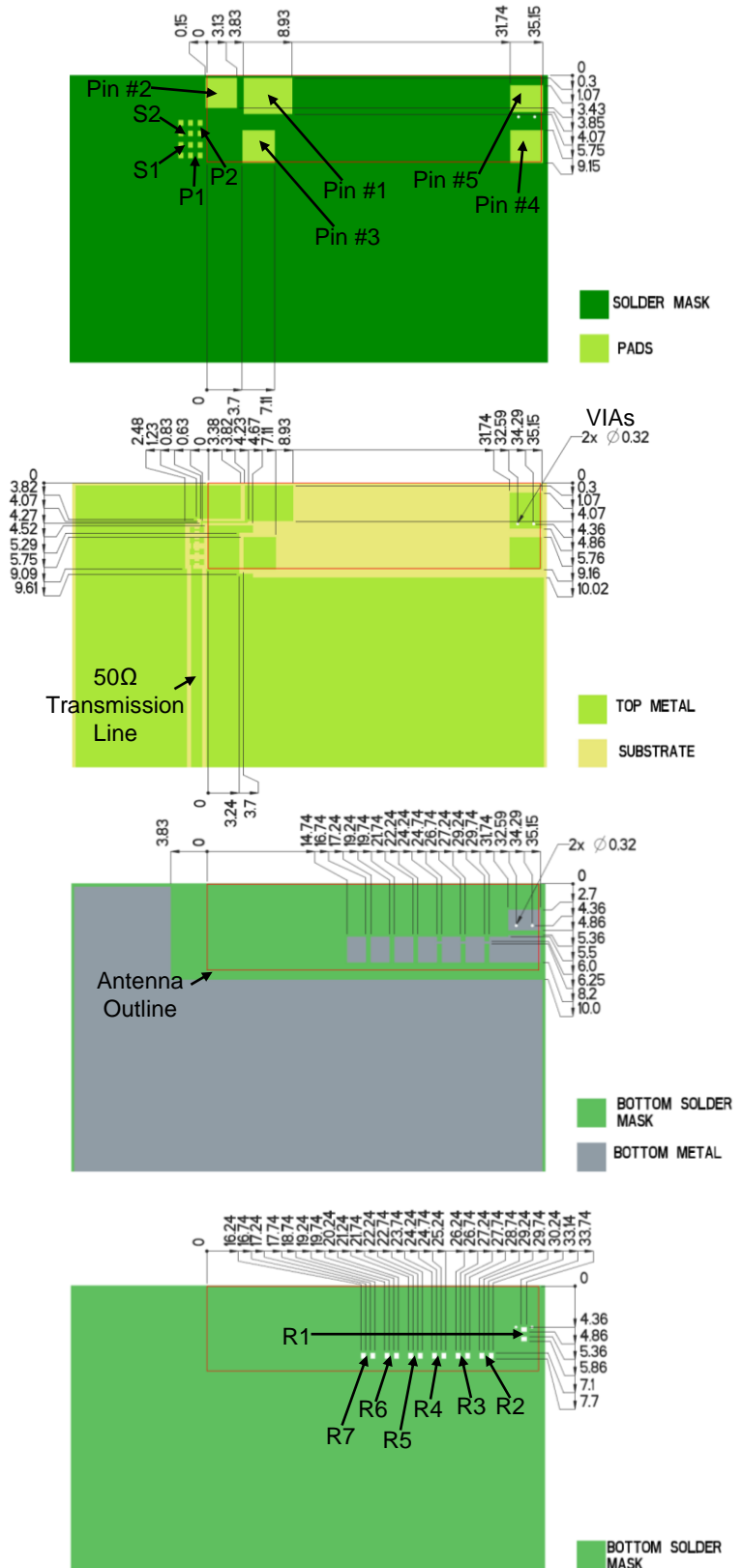
Pin Descriptions

| Pin# | Description     |
|------|-----------------|
| 1    | Feed            |
| 2    | Ground          |
| 3    | Dummy Pad       |
| 4    | Dummy Pad       |
| 5    | Low Band Tuning |

Matching & Tuning Component Values

| Component | Value | Tolerance |
|-----------|-------|-----------|
| P1        | 3.6nH | ±0.05nH   |
| S1        | 1.2pF | ±0.05pF   |
| S2        | 15nH  | ±0.3nH    |
| P2        | 1.8pF | ±0.05pF   |
| R1 – R7   | DNI   | N/A       |

Default Pi Matching Network values and (R1- R7) tuning instructions can be found under Antenna Matching Structure..



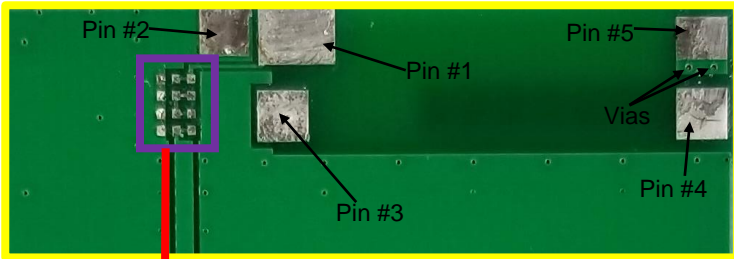


Cellular FR4 Ethertronics' Embedded Antenna Specifications.  
Ethertronics produces a wide variety of standard and custom antennas to meet user needs.

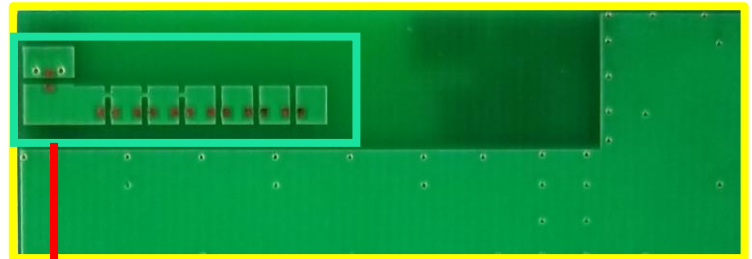
### Antenna Matching Structure

Typical matching values on 50 x 110 mm PCB

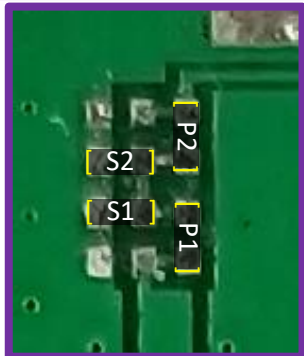
Demo Board Front View



Demo Board Back View



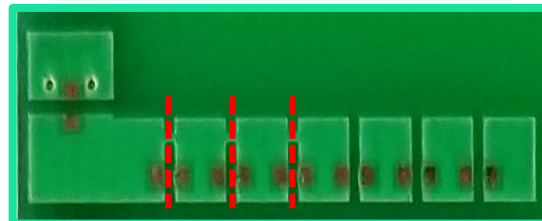
#### Antenna Matching



(Antenna Matching): pads are directly inline with the antenna feed trace.

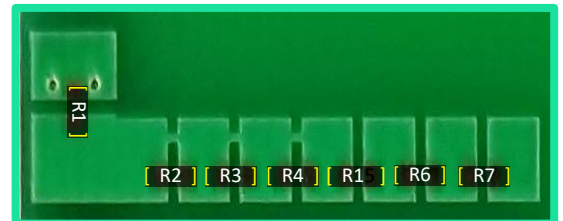
#### Low Band Tuning

Tune Low Band Higher  
(Cut Bridge Trace)



\*Cut Trace between pads shifts resonant frequency higher

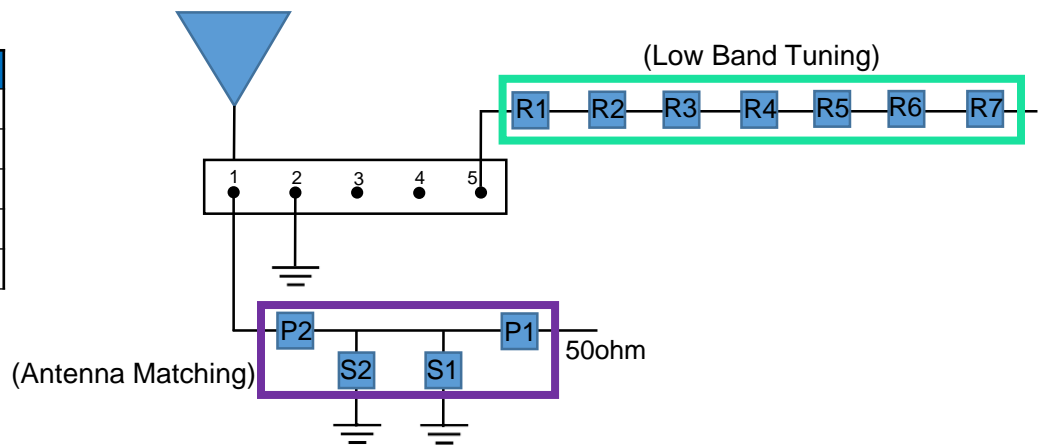
Tune Low Band Lower  
(Add 0Ω)



\*Bridging gaps with 0 ohm resistors shifts resonant frequency lower

#### Pin Descriptions

| Pin# | Description     |
|------|-----------------|
| 1    | Feed            |
| 2    | Ground          |
| 3    | Dummy Pad       |
| 4    | Dummy Pad       |
| 5    | Low Band Tuning |



|                         | P1      | S1       | S2     | P2       | (R1 - R7) |
|-------------------------|---------|----------|--------|----------|-----------|
| <b>Default Matching</b> | 3.6nH   | 1.2pF    | 15nH   | 1.8pF    | DNI       |
| <b>Tolerance</b>        | ±0.05nH | ± 0.05pF | ±0.3nH | ± 0.05pF | N/A       |





Cellular FR4 Ethertronics' Embedded Antenna Specifications.  
Ethertronics produces a wide variety of standard and custom antennas to meet user needs.

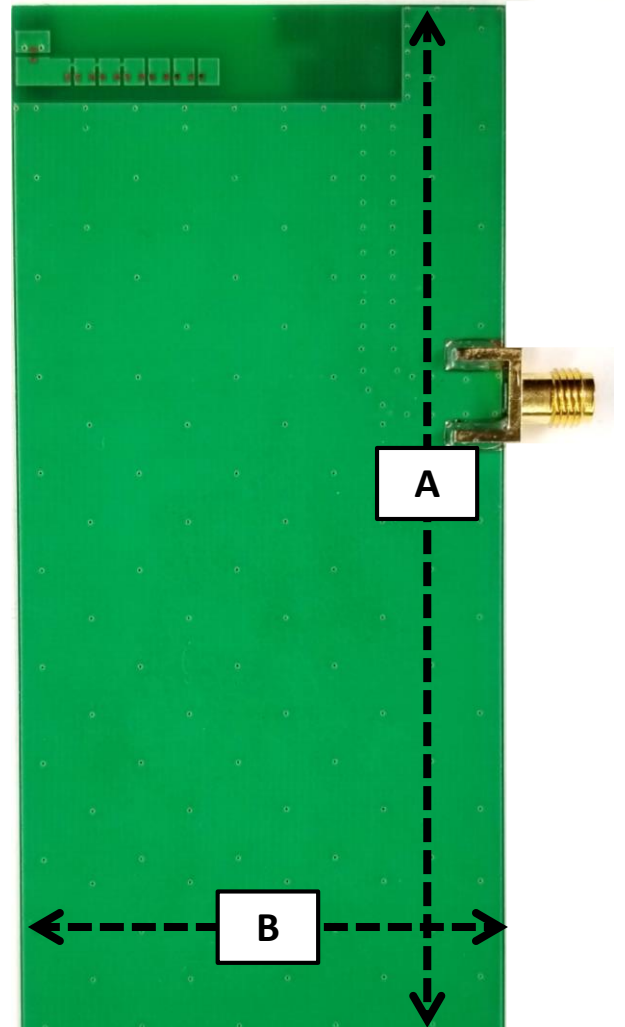
**Antenna Demo Board**

Demo Board Front View/Back View

| Part Number | A (mm) | B (mm) | C (mm) |
|-------------|--------|--------|--------|
| P522304-02  | 110    | 50.0   | 15.0   |



**Front View**



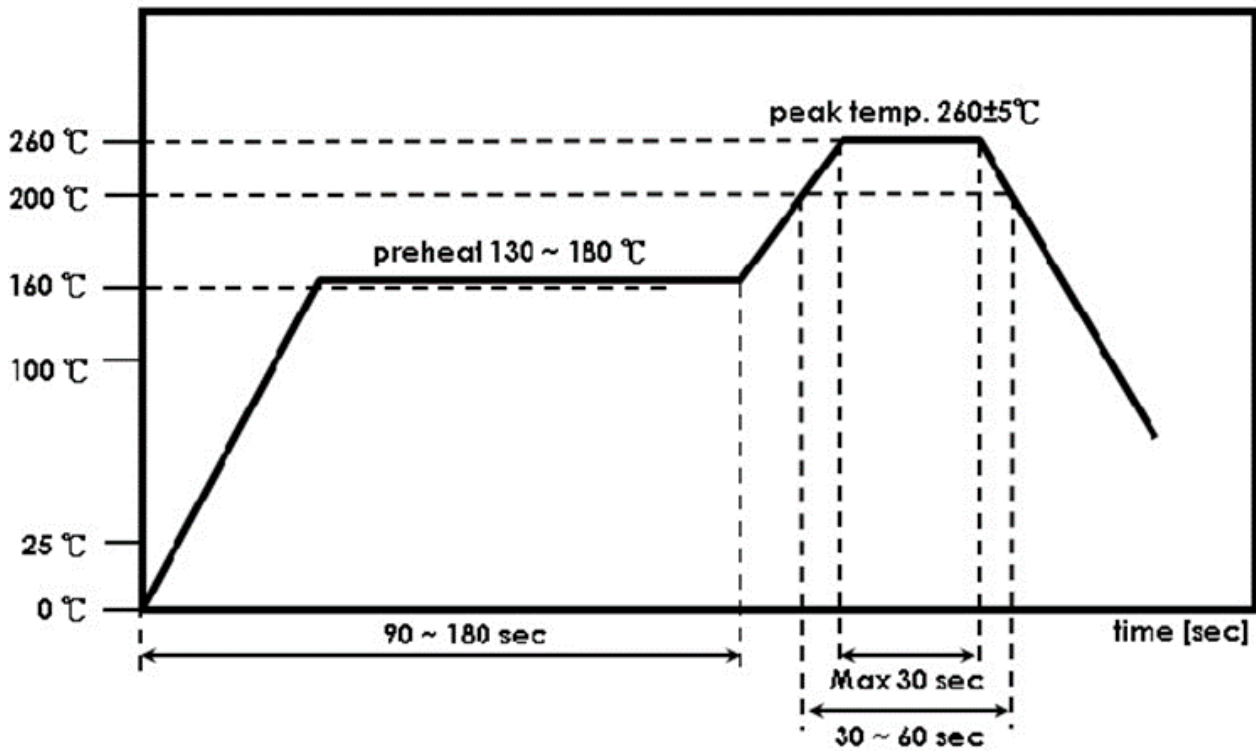
**Back View**



Cellular FR4 Ethertronics' Embedded Antenna Specifications.  
Ethertronics produces a wide variety of standard and custom antennas to meet user needs.

### Recommended Reflow Soldering Profile

The recommended method for soldering the antenna to the board is forced convection reflow soldering. The following suggestions provide information on how to optimize the reflow process for the FR4 antenna:



\*Adjust the reflow duration to create good solder joints without raising the antenna temperature beyond the allowed maximum of 260° C.



## X-ON Electronics

Largest Supplier of Electrical and Electronic Components

*Click to view similar products for [Antennas](#) category:*

*Click to view products by [Kyocera AVX](#) manufacturer:*

Other Similar products are found below :

[GAN30084EU](#) [930-033-R](#) [GW17.07.0250E](#) [1513563-1](#) [EXE902SM](#) [APAMPG-117](#) [MAF94383](#) [W3908B0100](#) [W6102B0100](#) [YE572113-30RSMM](#) [108-00014-50](#) [66089-2406](#) [SPDA17RP918](#) [A09-F8NF-M](#) [A09-F5NF-M](#) [RGFRA1903041A1T](#) [W3593B0100](#) [W3921B0100](#) [SIMNA-868](#) [SIMNA-915](#) [SIMNA-433](#) [W1044](#) [W1049B090](#) [A75-001](#) [WTL2449CQ1-FRSMM](#) [CPL9C](#) [EXB148BN](#) [0600-00060](#) [TRA9020S3PBN-001](#) [GD5W-28P-NF](#) [MA9-7N](#) [GD53-25](#) [GD5W-21P-NF](#) [C37](#) [MAF94051](#) [MA9-5N](#) [EXD420PL](#) [B1322NR](#) [QWFTB120](#) [MAF94271](#) [MAF94300](#) [GPSMB301](#) [FG4403](#) [AO-AGSM-OM54](#) [5200232](#) [MIKROE-2349](#) [WCM.01.0111](#) [MIKROE-2393](#) [MIKROE-2352](#) [MIKROE-2350](#)