ethertronics
AN AVX GROUP COMPANY

DATASHEET
Part No. M830120
Product: GNSS or GPS L1/L2/L5 Embedded Ceramic Antenna

Part No. M830120
GNSS or GPS L1/L2/L5 Ceramic Antenna

1.575 / 1.561 / 1.606 GHz or 1575.42 / 1227.6 / 1176.45 MHz

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

*GPS L1/L2/L5 layout offered in Appendix 1

GPS / GLONASS / Beidou / Galileo or GPS L1,L2,L5 Ceramic Antenna

1.575 GHz, 1.561 GHz, 1.606 GHz;
1575.42 MHz, 1227.6 MHz, 1176.45 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
- POS, Headsets, Tablets
- Gateway, Access Point
- Handheld
- Telematics
- Tracking
- Healthcare
- M2M, Industrial devices
- Smart Grid
- OBD-II

Ethertronics' series of ceramic 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 GPS enabled handheld devices.

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.

Electrical Specifications

Typical performance on 40 x 80 mm PCB

Frequency (MHz)	1559 – 1563	1575	1559 – 1591	1593 – 1610	1575.42, 1227.6, 1176.45
GNSS Bands	Beidou	GPS	Galileo	Glonass	GPS L1/L2/L5
Peak Gain (dBi)	1.76	1.92	1.92	1.71	Refer to Appendix 1
Efficiency (%)	70	73	70	62	
Frequency f_o (GHz)	1.561	1.575	1.575	1.603	
VSWR	2.0:1 max				
Impedance	50 Ω unbalanced				

Mechanical Specifications & Ordering Part Number

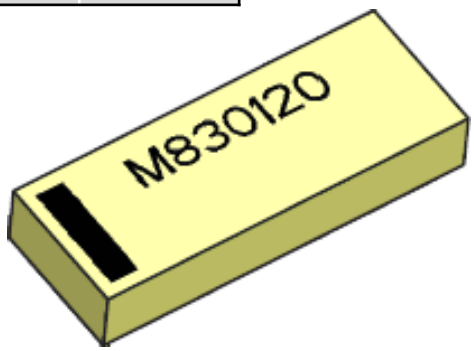
Ordering Part Number	M830120
Size (mm)	8.00 x 3.00 x 1.33
Mounting	Surface mount
Weight (grams)	0.2
Packaging	Tape & Reel, M830120 – 1,000 pieces per reel
Demo Board	**M830120-01:** GPS, GLONASS, Galileo, Beidou **M830120-02:** L1, L2, L5 – Appendix 1

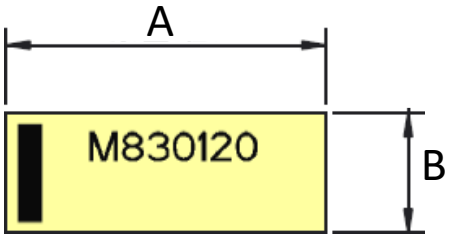
GNSS Ethertronics' Embedded Ceramic Antenna Specifications
Ethertronics produces a wide variety of standard and custom antennas to meet user needs.

Antenna Dimensions

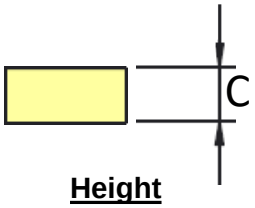
Typical antenna dimensions (mm)

Part Number	A (mm)	B (mm)	C (mm)
M830120	8.00 ± 0.2	3.00 ± 0.2	1.33 ± 0.1



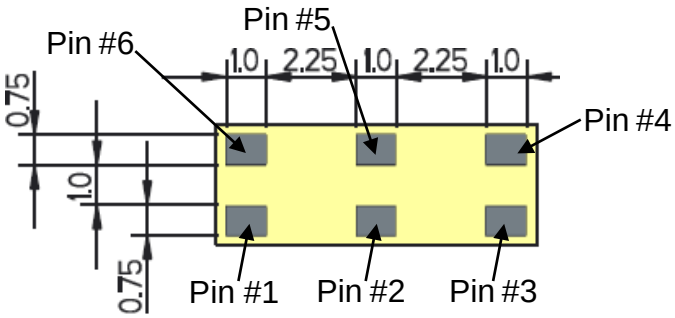


Top View



Height

Pin	Description
1	Ground
2	Dummy Pad
3	Matching circuit connection
4	Dummy Pad
5	Dummy Pad
6	Feed



Bottom View

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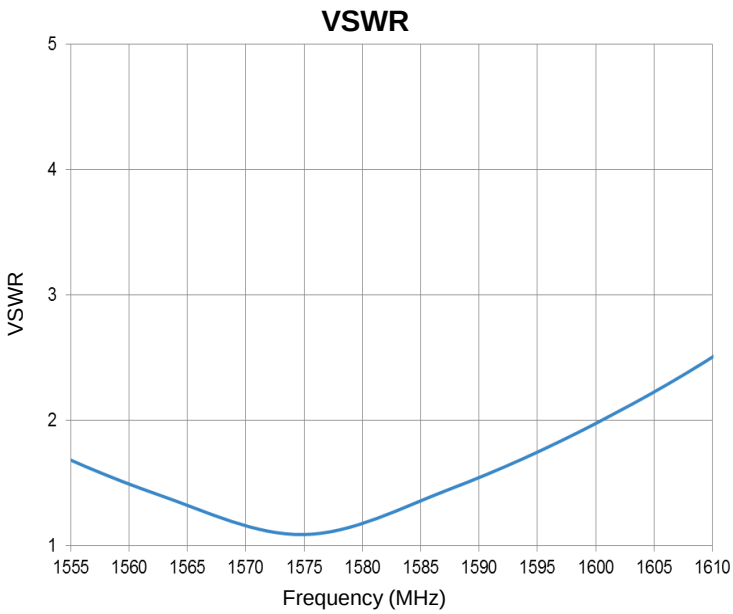
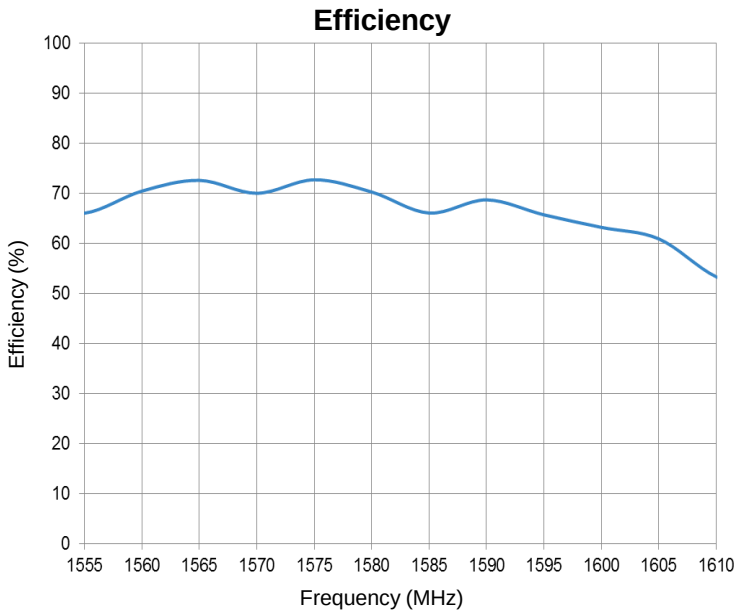
VSWR, Efficiency Plots

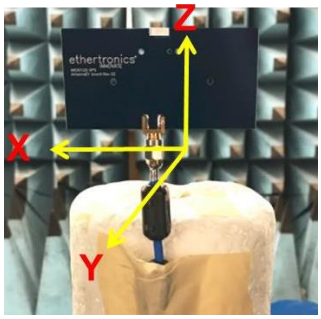
Typical performance on 40 x 80 mm PCB

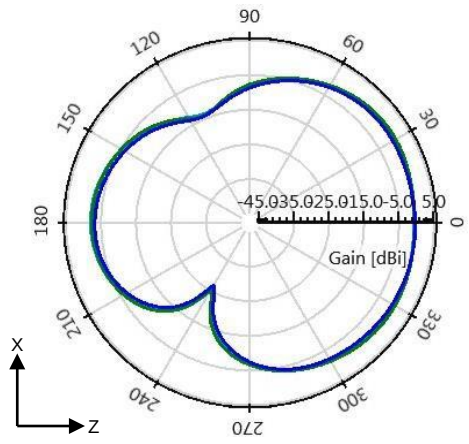


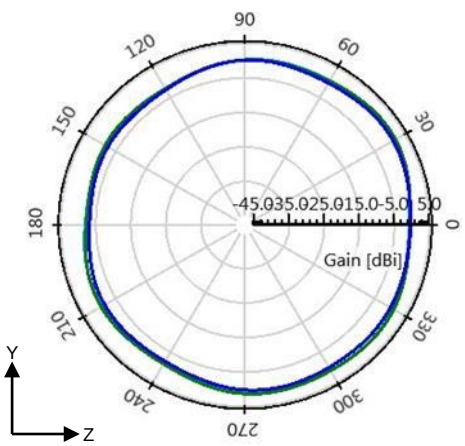


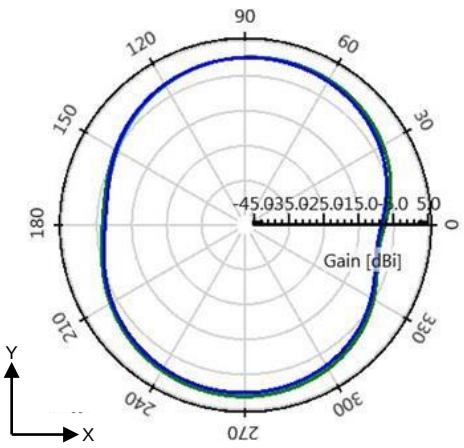
Antenna Radiation Patterns

Typical performance on 40 x 80 mm PCB
Measured @ 1560, 1575, 1605 MHz


Z
X
Y







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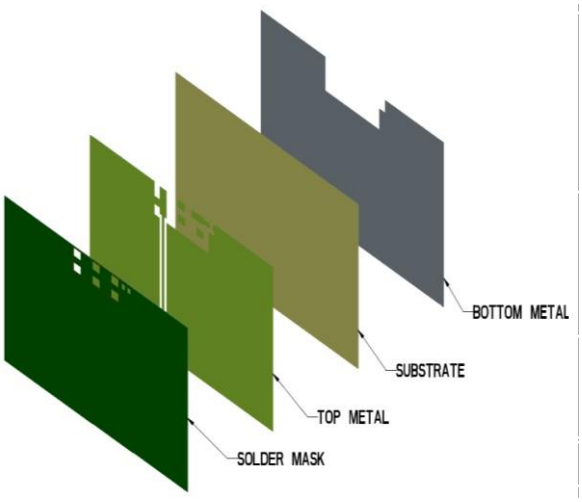
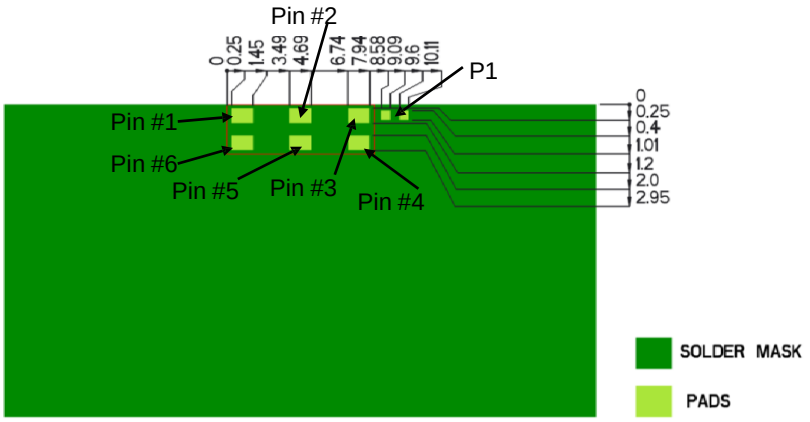
Antenna Layout

Typical layout dimensions (mm)

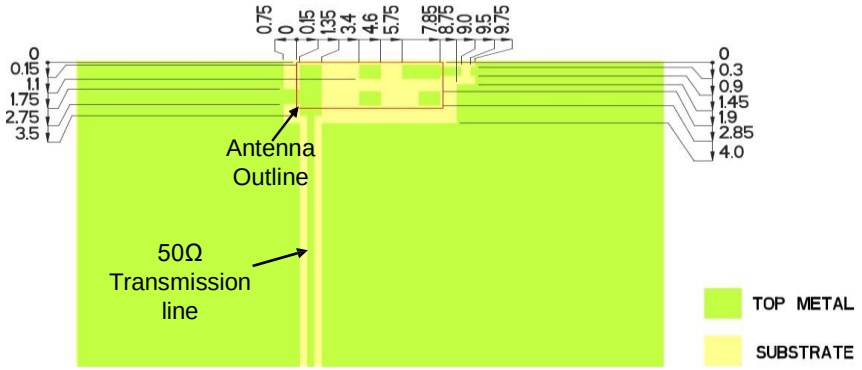




- Additional VIAS : Diam. 0.2mm to be placed around antenna, (no vias on transmission lines).
- Via holes must be covered by solder mask

Pin Descriptions

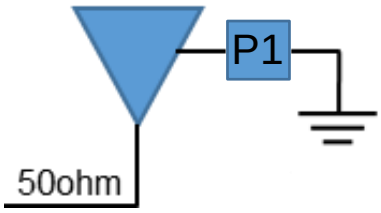
Pin#	Description
1	Ground
2	Dummy Pad
3	Matching circuit connection
4	Dummy Pad
5	Dummy Pad
6	Feed

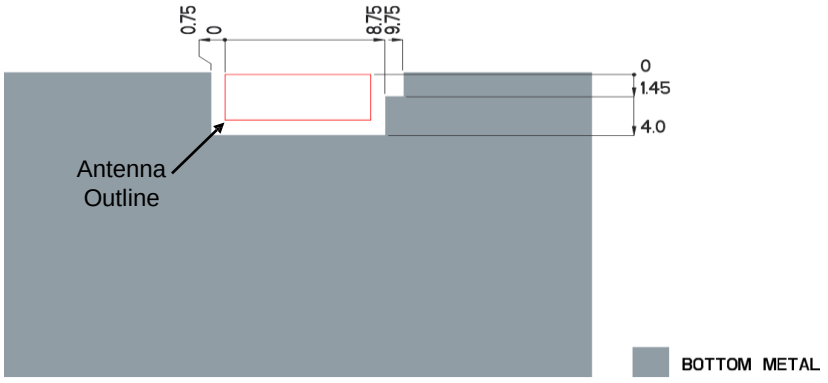


Matching Pi Network

Component	Value	Tolerance
P1	0Ω	N/A

*Actual matching values depend on customer design





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Antenna Layout Tips (General reference)

Important, layout guidelines for correct operation of Ethertronics Ceramic Antennas. Please read guidelines below before laying out the antenna in a device. Figure 1 shows the typical antenna layout. Figure 2 shows Ethertronics' antenna layout.

Other

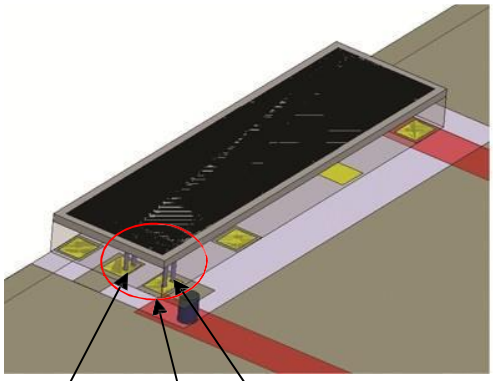

Figure 1
Typical Antenna Layout

Ethertronics

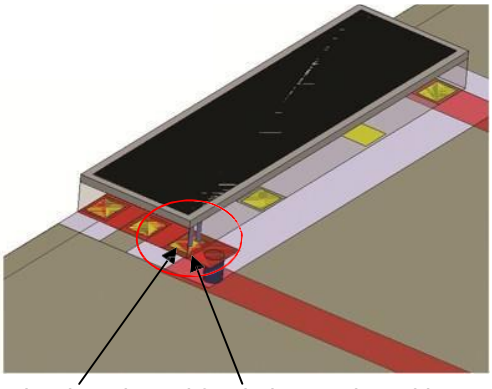

Figure 2
Ethertronics Antenna Layout
(Required)

- The antenna tuning loop is formed by the PCB layout.
- The feed pin and shorting pin are combined because it requires very close proximity to achieve more band- width.

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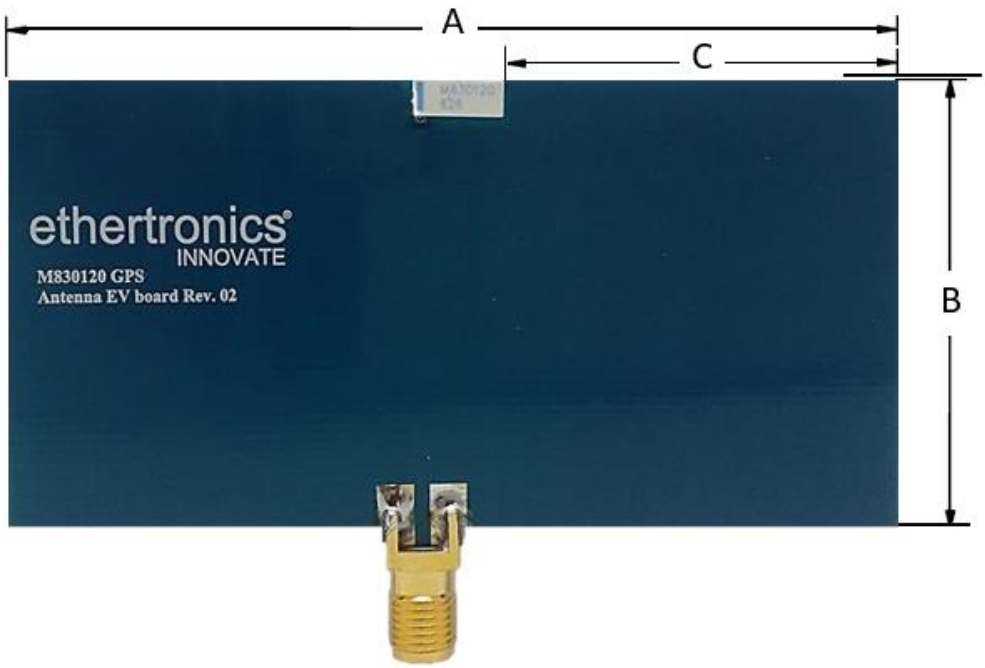
Antenna Demo Board

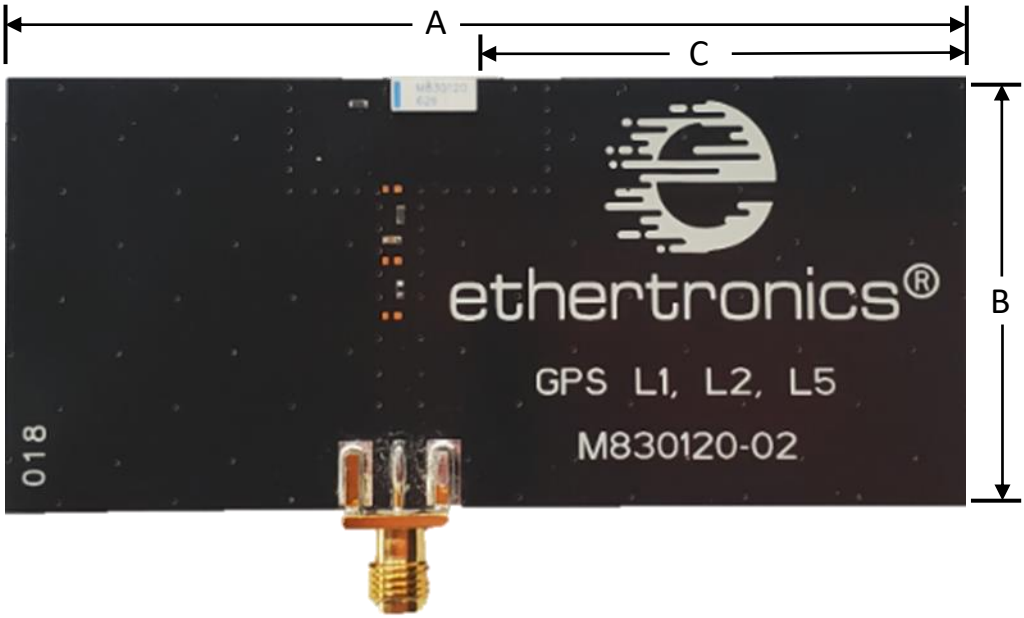
Typical layout dimensions (mm)

Part Number	Description	A (mm)	B (mm)	C (mm)
M830120-01	GPS, GLONASS, Galileo, Beidou	80.0	40.0	37.0
M830120-02	L1, L2, L5	90.0	40.0	46.3

M830120-01



M830120-02



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Appendix 1 GPS L1/L2/L5 Stamped Metal Ethertronics' Embedded Antenna Specifications
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Appendix 1

Appendix 1 gives instructions on how to achieve GPS L1/L2/L5 performances through layout and impedance matching network. (1575.42/1227.6/1176.45 MHz)

Frequency (MHz)	1575.42	1227.6	1176.45
GPS Band	L1	L2	L5
Peak Gain	2.7 dBi	2.8 dBi	2.7 dBi
Average Efficiency (%)	80	76	77
VSWR Match	2.0:1 max	2.5:1 max	2.5:1 max
Polarization	Linear		
Power Handling	0.5 Watt CW		
Feed Point Impedance	50 Ω unbalanced		

*Data shown above has Appendix 1 matching applied on 90 x 40 mm pcb.

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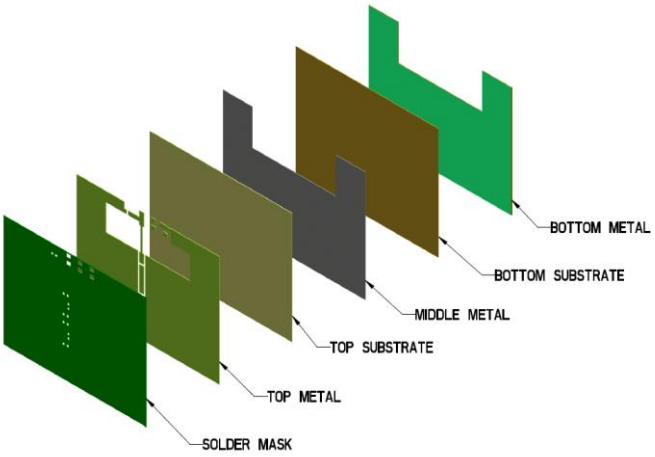
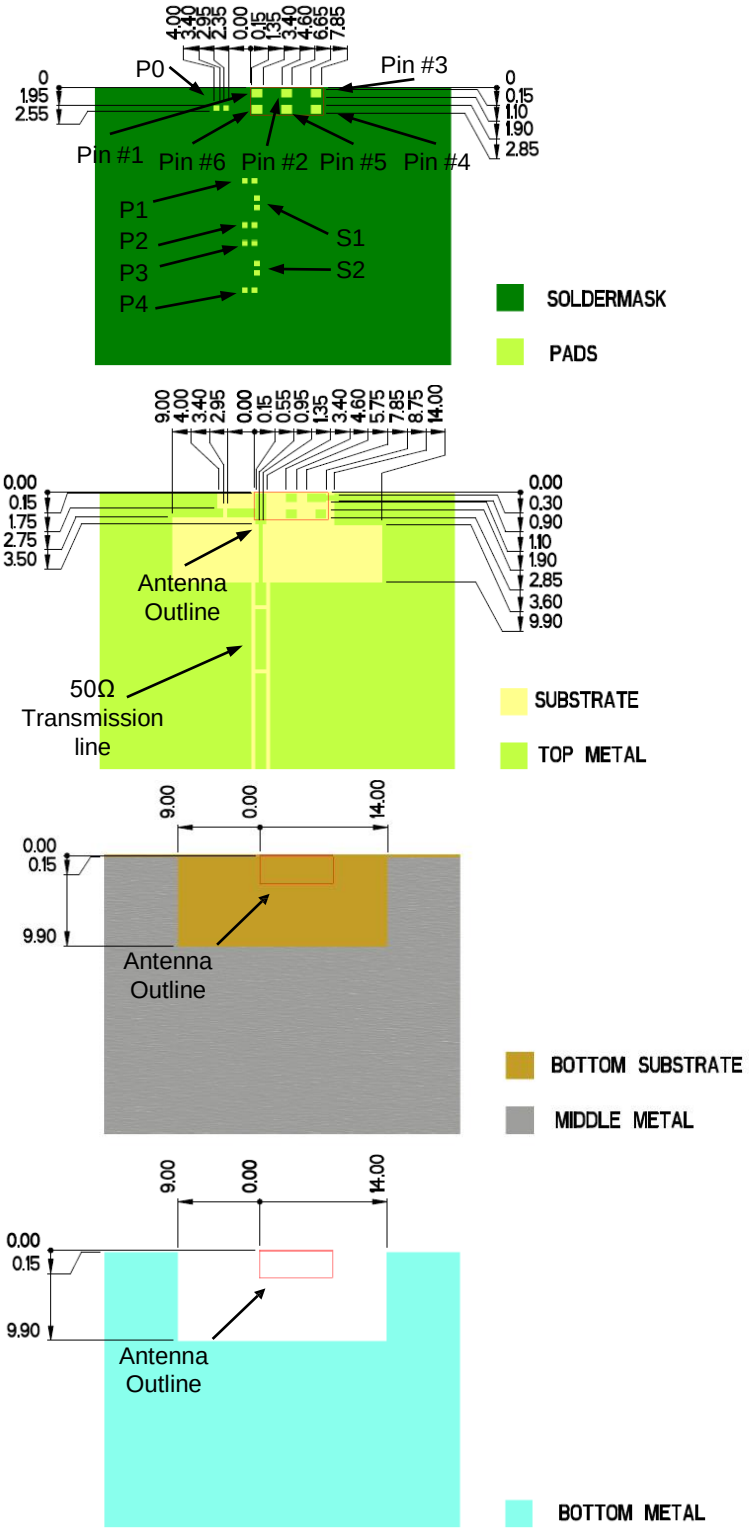
Antenna Layout

Typical layout dimensions (mm)





- Additional VIAS : Diam. 0.2mm to be placed around antenna, (no vias on transmission lines).
- Via holes must be covered by solder mask

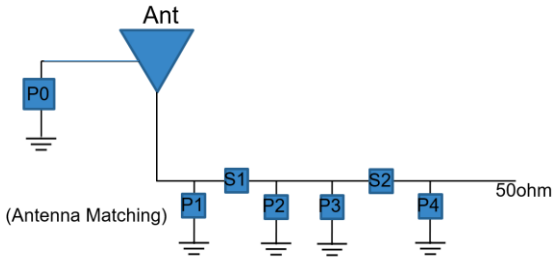
Pin Descriptions

Pin#	Description
1	Ground
2	Dummy Pad
3	Matching circuit connection
4	Dummy Pad
5	Dummy Pad
6	Feed

Matching Pi Network

P0	P1	S1	P2	P3	S2	P4
0.5 pF	DNI	2 pF	8.2 nH	DNI	0 Ω	DNI

*Actual matching values depend on customer design



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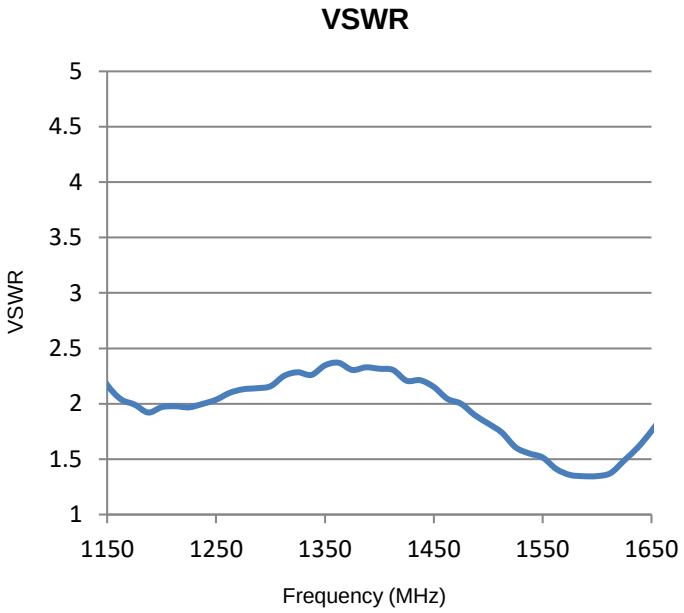
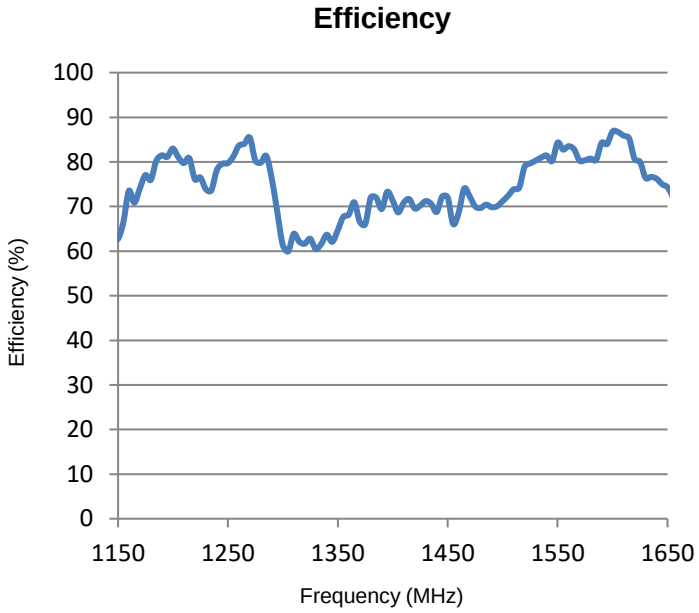
VSWR, Efficiency Plots

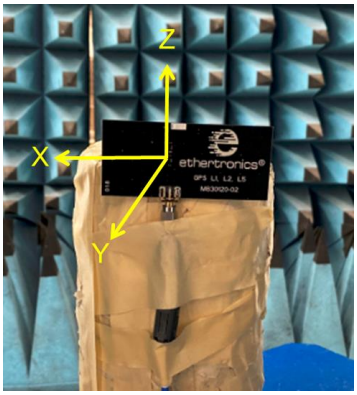
Typical performance on 40 x 90 mm PCB

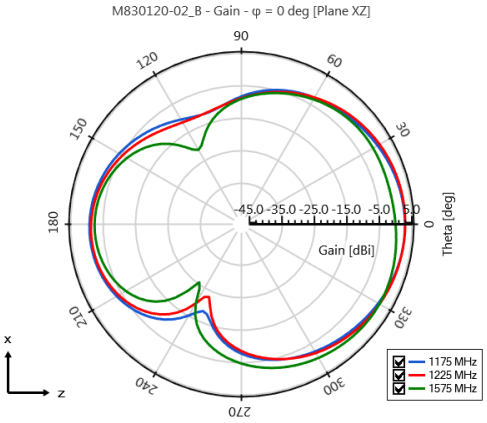


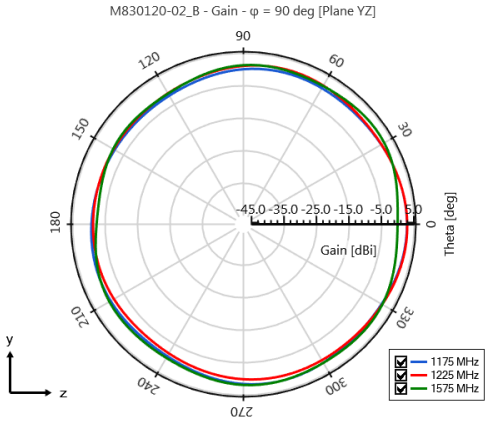


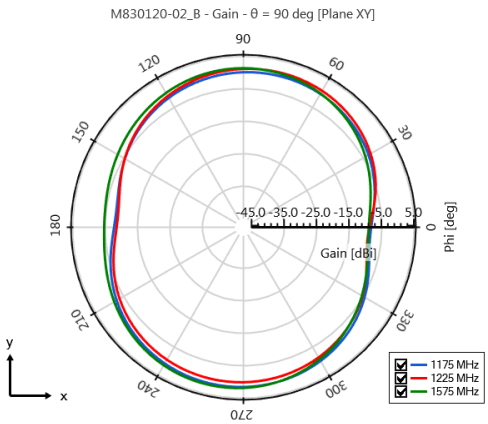
Antenna Radiation Patterns

Typical performance on 40 x 90 mm PCB
Measured @ 1575.42, 1227.6, 1176.45 MHz









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