

Part No. M830120 GNSS or GPS L1/L2/L5/L6 Ceramic Antenna

1575 / 1561 / 1606 MHz or 1575.42 / 1227.6 / 1176.45 / 1278.75 MHz

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



*GPS L1/L2/L5/L6 layout offered in Appendix 1

GPS / GLONASS / BeiDou / Galileo or GPS L1,L2,L5,L6 Ceramic Antenna

1575 MHz, 1561 MHz, 1606 MHz;
 1575.42 MHz, 1227.6 MHz, 1176.45 MHz
 1278.75 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 devices
- Transportation, Marine & Agriculture
- Tracking, Location based applications
- Healthcare
- M2M and Industrial IoT devices
- Smart Grid
- OBD-II

KYOCERA AVX 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. With a smaller and thinner size on the PCB, the M830120 makes an ideal multi-band GNSS antenna solution for compact high precision navigation or asset tracking devices where board space is at a premium. This innovative antenna is designed for the best accuracy using GPS L1, L2, L5 and L6 bands covering all other GNSS bands including GLONASS, Galileo, BeiDou.

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. KYOCERA AVX' 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, 1278.75
GNSS Bands	BeiDou	GPS	Galileo	Glomass	GPS L1/L2/L5/L6
Peak Gain (dBi)	1.76	1.92	1.92	1.71	Refer to Appendix 1
Efficiency (%)	70	73	70	62	
Frequency f ₀ (MHz)	1561	1575	1575	1603	
VSWR	2.0:1 max				
Impedance	50 Ω unbalanced				

Mechanical Specifications & Ordering Part Number

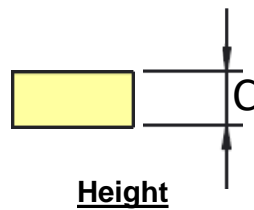
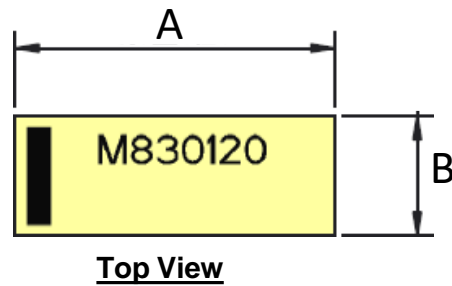
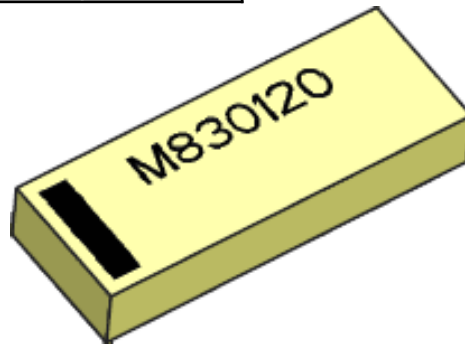
Ordering Part Number	M830120
Size (mm)	8.00 x 3.00 x 1.33
Mounting	Surface mount
Weight (grams)	0.2
Packaging	Tape & Reel, M830120 – 1,000 pieces per reel
Demo Board	M830120-01: GPS, GLONASS, Galileo, BeiDou M830120-02: L1, L2, L5, L6 – Appendix 1

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

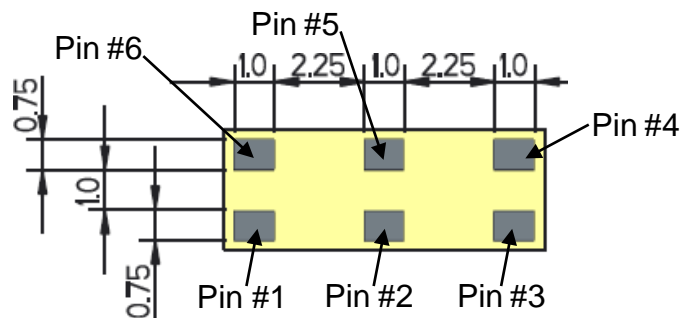
Antenna Dimensions

Typical antenna dimensions (mm)

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



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

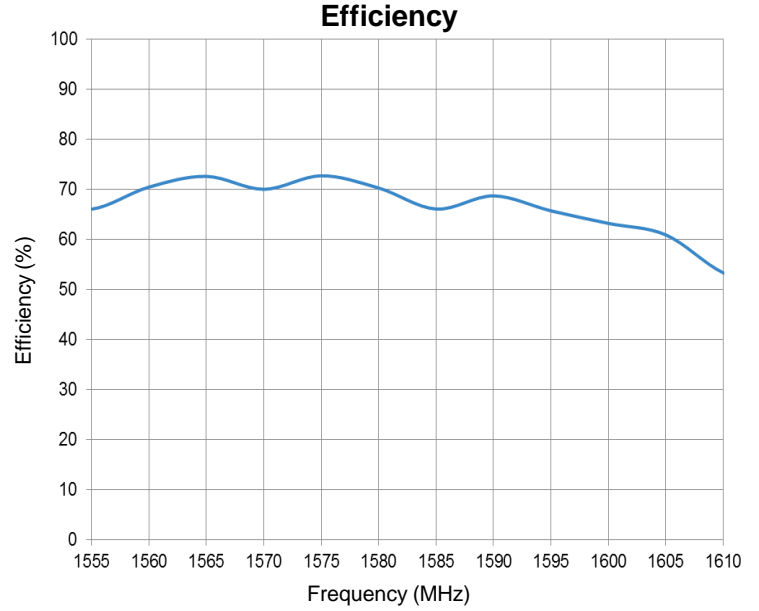
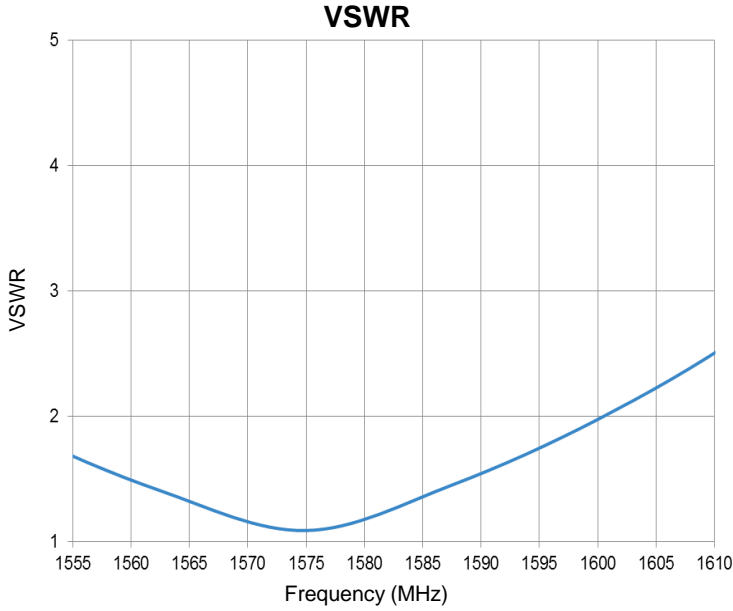


Bottom View

KYOCERA AVX GNSS Embedded Ceramic Antenna Specifications
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VSWR, Efficiency Plots

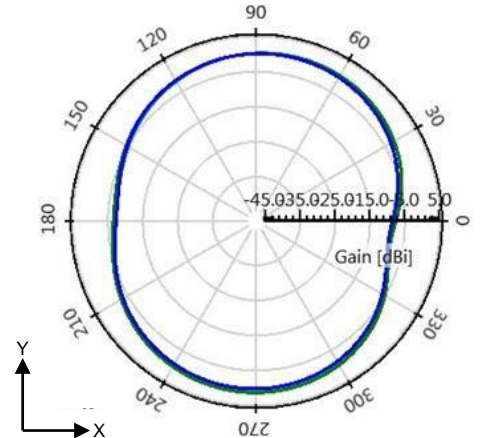
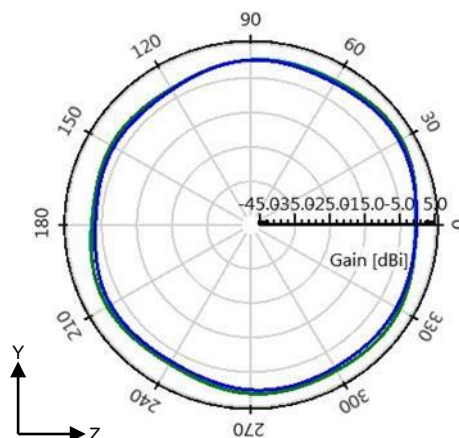
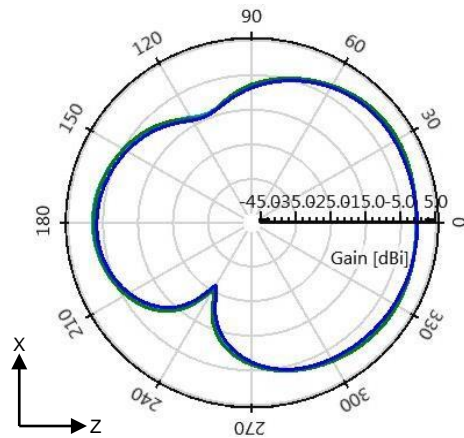
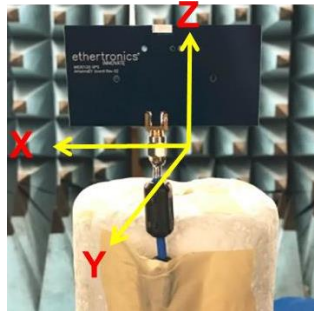
Typical performance on 40 x 80 mm PCB



Antenna Radiation Patterns

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

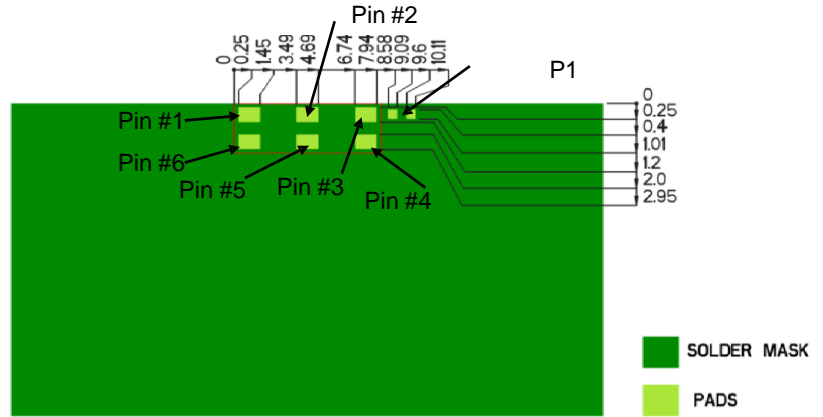
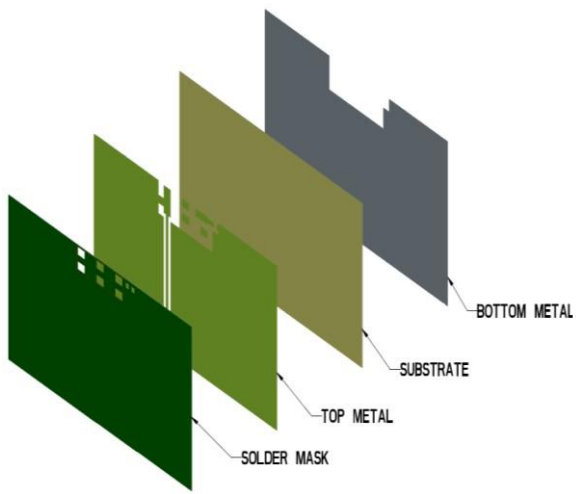
- 1560 MHz
- 1575 MHz
- 1605 MHz



KYOCERA AVX Embedded Ceramic Antenna Specifications
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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

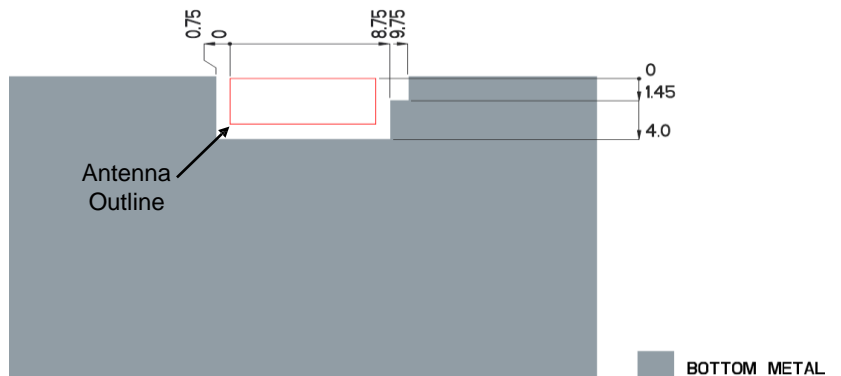
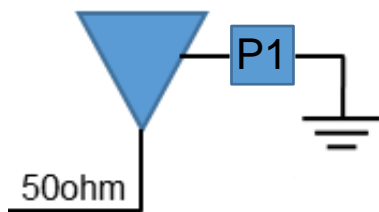
Pin#	Description
1	Ground
2	Dummy Pad
3	Matching circuit connection
4	Dummy Pad
5	Dummy Pad
6	Feed



Matching Pi Network

Component	Value	Tolerance
P1	0Ω	N/A

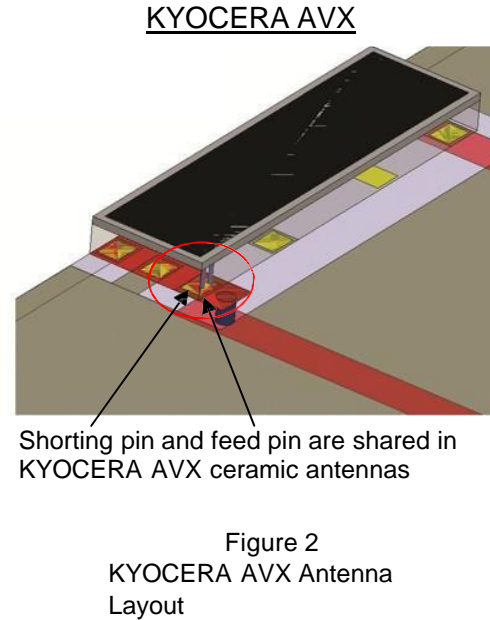
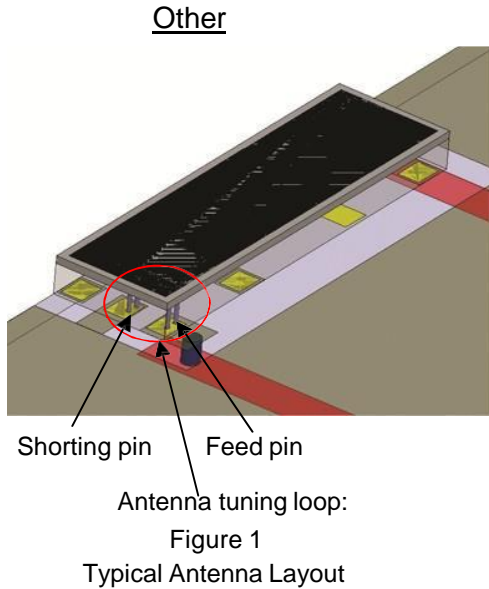
*Actual matching values depend on customer design



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

Antenna Layout Tips (General reference)

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



- 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.

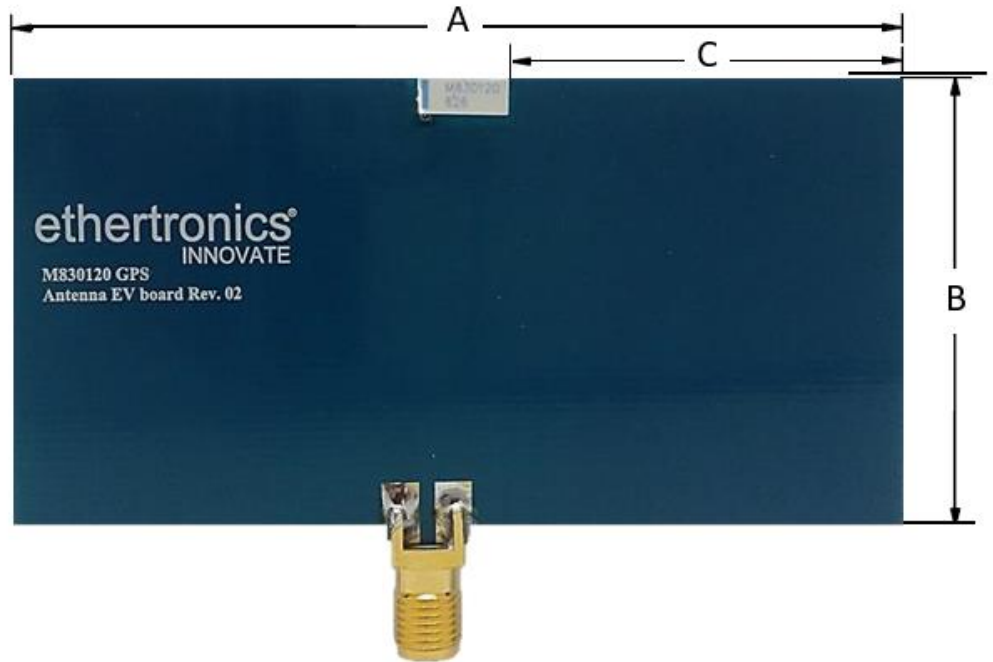
GNSS KYOCERA AVX Embedded Ceramic Antenna Specifications
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Antenna Demo Board

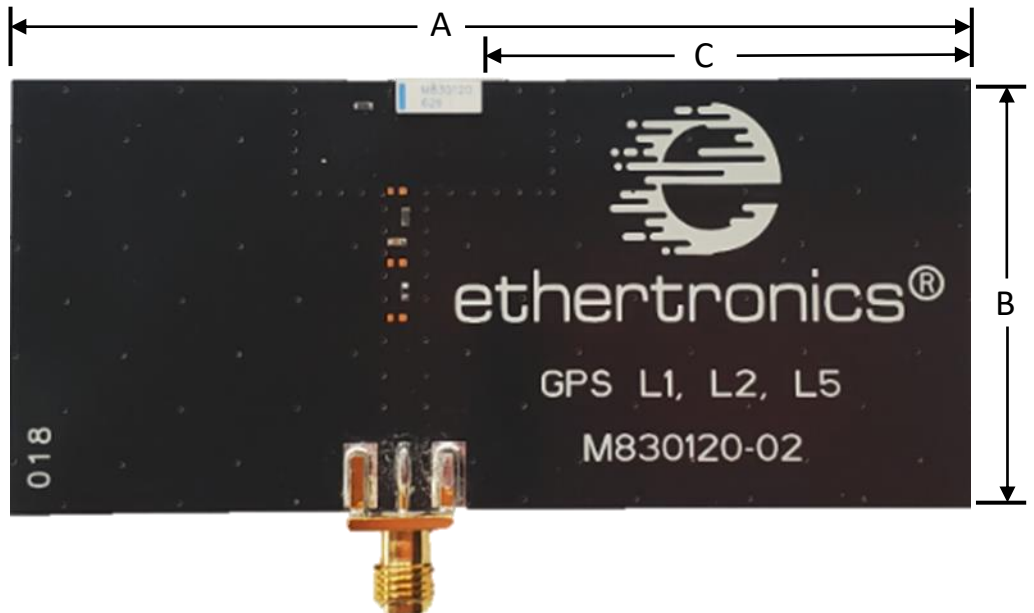
Typical layout dimensions (mm)

Part Number	Description	A	B	C
M830120-01	GPS, GLONASS, Galileo, BeiDou	80.0	40.0	37.0
M830120-02	L1, L2, L5, L6	90.0	40.0	46.3

M830120-01



M830120-02



Appendix 1 GPS L1/L2/L5/L6 Embedded Ceramic Antenna Specifications
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

Appendix 1

(M830120-02)

Appendix 1 gives instructions on how to achieve GPS L1/L2/L5/L6 performances through layout and impedance matching network.

(1575.42/1227.6/1176.45/1278.75 MHz)

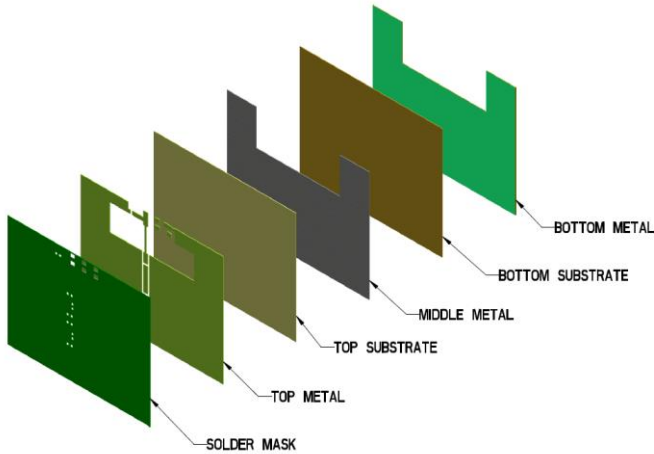
Frequency (MHz)	1575.42	1227.6	1176.45	1278.75
GPS Band	L1	L2	L5	L6
Peak Gain	2.7 dBi	2.8 dBi	2.7 dBi	3.0 dBi
Average Efficiency (%)	80	76	77	80
VSWR Match	2.0:1 max	2.5:1 max	2.5:1 max	2.5:1 max
Polarization	Linear			
Power Handling	0.5 Watt CW			
Feed Point Impedance	50 Ω unbalanced			

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

Appendix 1 GPS L1/L2/L5/L6 Embedded Ceramic Antenna Specifications
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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

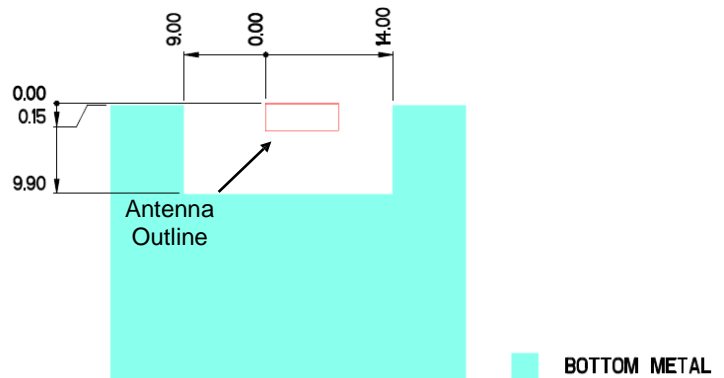
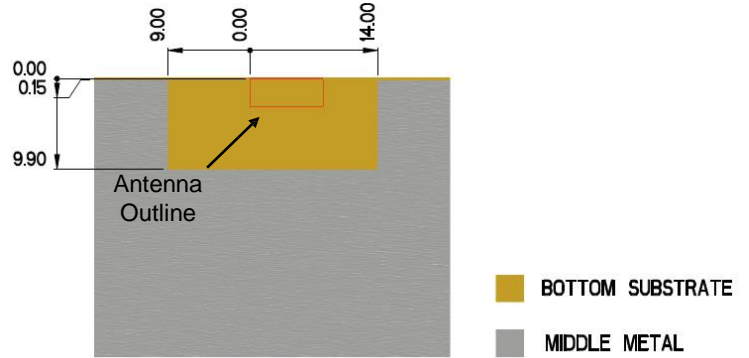
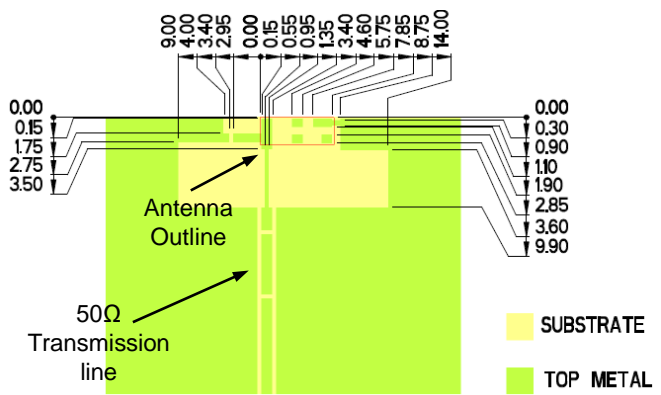
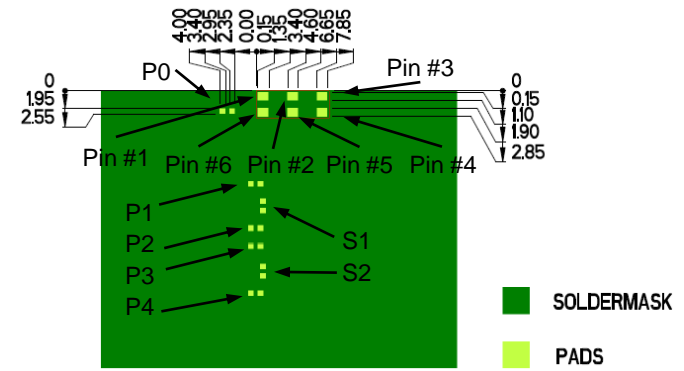
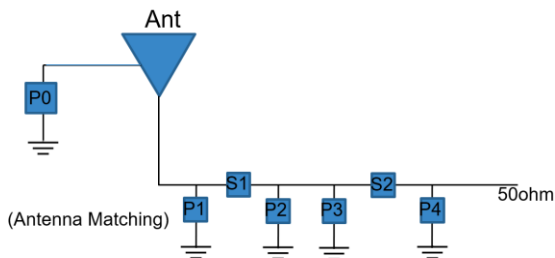
Pin Descriptions

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

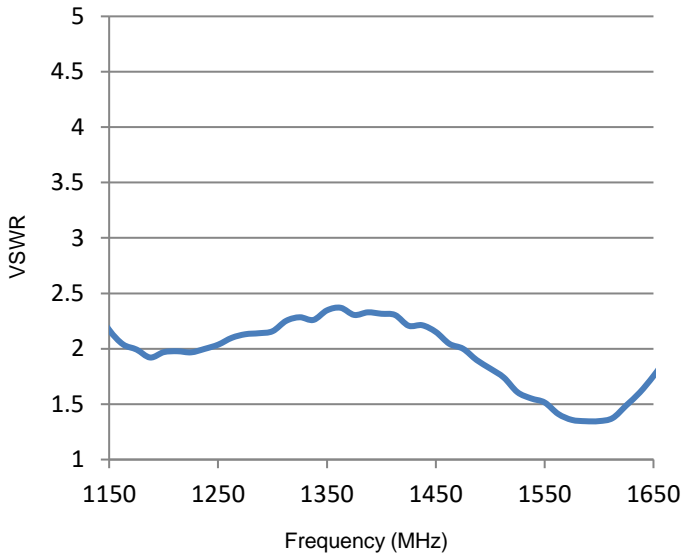


Appendix 1 GPS L1/L2/L5/L6 Embedded Ceramic Antenna Specifications
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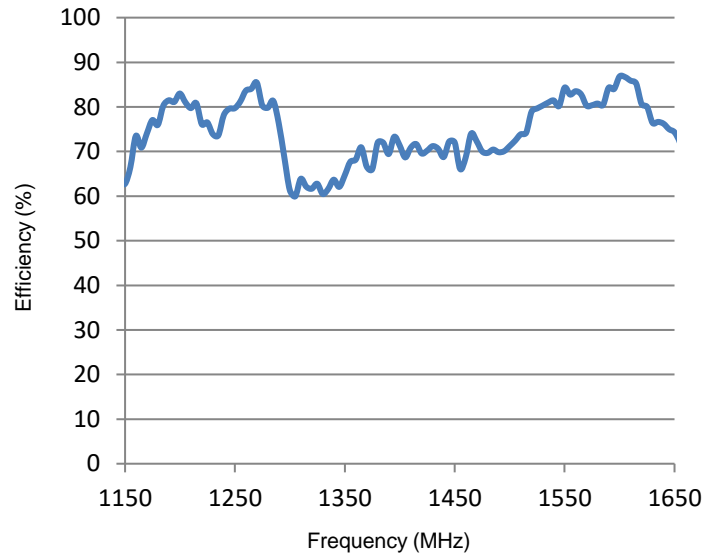
VSWR, Efficiency Plots

Typical performance on 40 x 90 mm PCB

VSWR

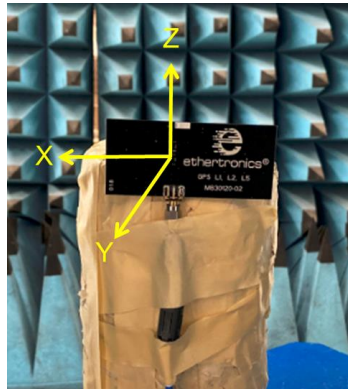


Efficiency

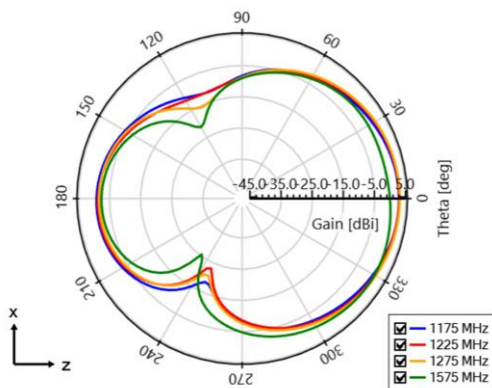


Antenna Radiation Patterns

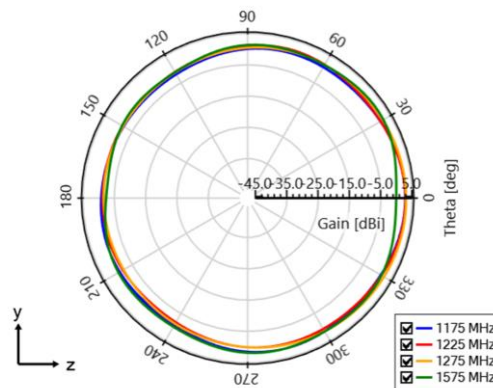
Typical performance on 40 x 90 mm PCB
 Measured @ 1575.42, 1227.6, 1176.45, 1278.75 MHz



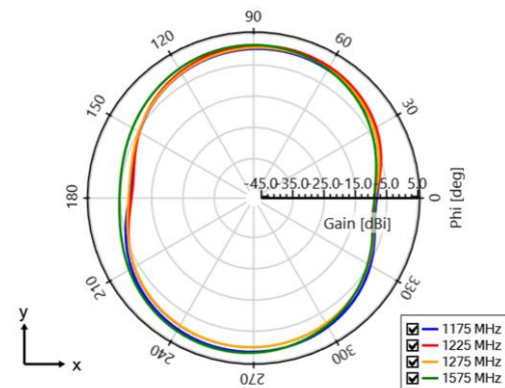
M830120-02_B - Gain - $\phi = 0$ deg [Plane XZ]



M830120-02_B - Gain - $\phi = 90$ deg [Plane YZ]



M830120-02_B - Gain - $\theta = 90$ deg [Plane XY]



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