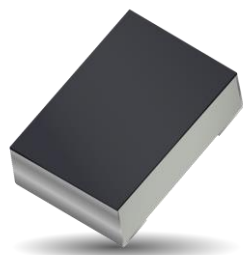


Part No. 9002137

GNSS L1/L2/L5/L6 Chip Antenna

(1575.42 / 1227.6 / 1176.45 / 1278.75) MHz or (1560-1610) MHz

Supports: GNSS systems, Global antenna embedded systems, Satellite positioning systems



KYOCERA AVX series of chip 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 GNSS-enabled handheld devices.

GNSS L1, L2, L5, L6 Chip Antenna

1575.42 MHz, 1227.6 MHz, 1176.45 MHz
 1278.75 MHz; or
 1560 MHz-1610 MHz

KEY BENEFITS

Greater Flexibility with Unique Form Factors

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

Quicker Time-to-Market

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

Environmental Compliance

Products are the latest RoHS version compliant.

APPLICATIONS

- Embedded design
- POS, Headsets, Tablets
- Gateway, Access Point
- Handheld
- Telematics Tracking
- Healthcare (FDA Class I)
- M2M, Industrial devices
- Smart Grid
- OBD-II

Electrical Specifications

Typical performance on 90 x 40 mm PCB

| Frequency (MHz) | 1575.42 | 1227.6 | 1176.45 | 1278.75 | 1560-1610 | |
|------------------------|---|-----------|-----------|-----------|---------------------|--|
| GNSS Band | L1 | L2 | L5 | L6 | GNSS | |
| Average Efficiency (%) | 75 | 86 | 72 | 85 | Refer to Appendix 1 | |
| VSWR Match | 1.5:1 max | 1.7:1 max | 2.0:1 max | 1.8:1 max | | |
| Polarization | Linear | | | | | |
| Power Handling | 0.5 Watt CW | | | | | |
| Feed Point Impedance | 50 Ω unbalanced | | | | | |
| Additional Resources | Download Simulation Files | | | | | |

Mechanical Specifications & Ordering Part Number

| Ordering Part Number | 9002137 |
|----------------------------------|---|
| Size (mm) | 1.00 x 0.55 x 0.40 |
| Mounting | SMT (0402) |
| Weight (grams) | < 0.001 |
| Packaging | Tape & Reel 9002137 – 5,000 pieces per reel |
| Demo Board | 9002137-06 (L1, L2, L5, L6) 9002137-05 (GNSS) Appendix 1 |
| Operating Temperature | -55 °C to +125 °C |
| Storage Temperature/ Humidity | -15 °C to +35 °C / \leq 65% (Recommended) |
| Standard(s) Compliance | REACH, RoHS |
| Additional Resources | Download DXF |

GNSS L1/L2/L5/L6 or GNSS KYOCERA AVX Embedded Chip Antenna Specifications
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

Environmental Specs Summary

Typical antenna dimensions (mm)

| | |
|---|--|
| Life (Endurance) MIL-STD-202F Method 108A | Conditions: 125°C, 2UR,1000 hours Acceptance Criteria: No visible damage, $\Delta C/C \leq 2\%$ for $C \geq 5\text{pF}$ $\Delta C \leq 0.25\text{pF}$ for $C < 5\text{pF}$. |
| Accelerated Damp Heat Steady State MIL-STD-202F Method 103B | Conditions: Expose to a $+35 \pm 3^\circ\text{C}$ spray of a 5% (by volume) resolution of NaCl in water for 48 hours. Acceptance Criteria: No visible Corrosion / Discoloration acceptable. |
| Temperature Cycling MIL-STD-202F Method 107E MIL-STD-883D Method 1010.7 | Conditions: -55°C to $+125^\circ\text{C}$, 15 cycles Acceptance Criteria: No visible damage, $\Delta C/C \leq 2\%$ for $C \geq 5\text{pF}$, $\Delta C \leq 0.25\text{pF}$ for $C < 5\text{pF}$ |
| Resistance to Solder Heat IEC-68-2-58 | Conditions: $260^\circ\text{C} \pm 5^\circ\text{C}$ for 10 secs Acceptance Criteria: C remains within initial limits |

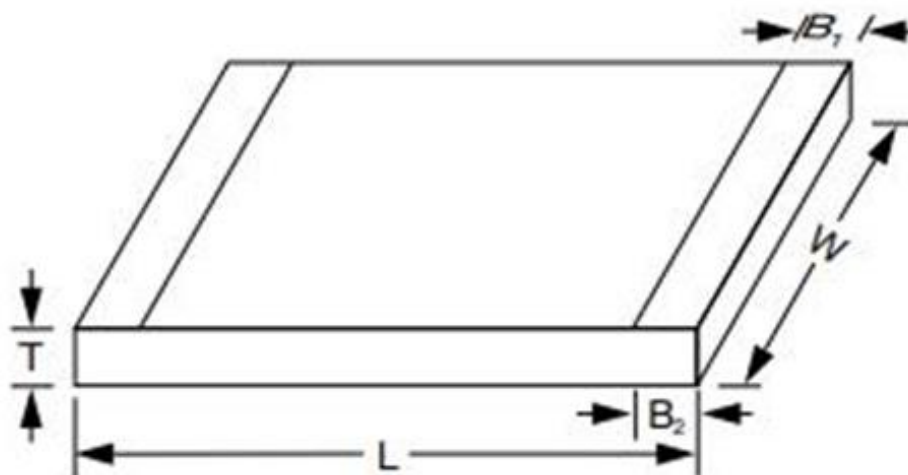
GNSS L1/L2/L5/L6 or GNSS KYOCERA AVX Embedded Chip Antenna Specifications
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

Antenna Dimensions

Typical antenna dimensions (mm)

| Part Number | L | W | T | B ₁ | B ₂ |
|-------------|-------------|-------------|-------------|----------------|----------------|
| 9002137 | 1.00 ± 0.10 | 0.55 ± 0.07 | 0.40 ± 0.10 | 0.00 + 0.10 | 0.20 ± 0.10 |

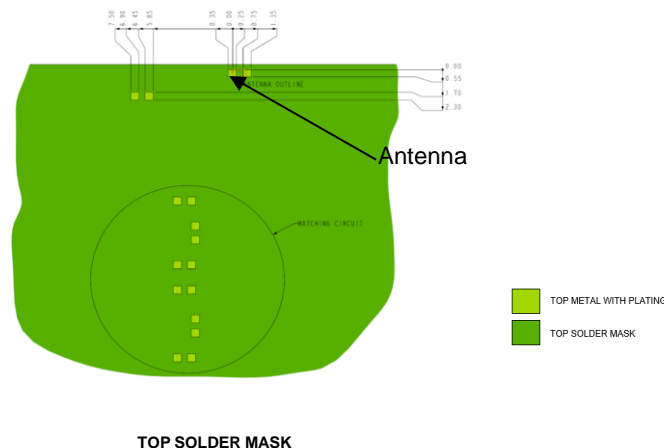
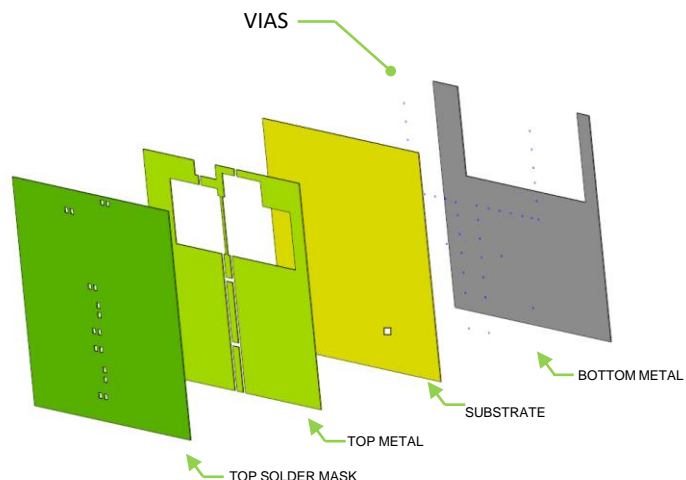
*Mount Black Side up



GNSS L1/L2/L5/L6 or GNSS KYOCERA AVX Embedded Chip Antenna Specifications
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

Layout (9002137-06)

Typical antenna dimensions (mm)

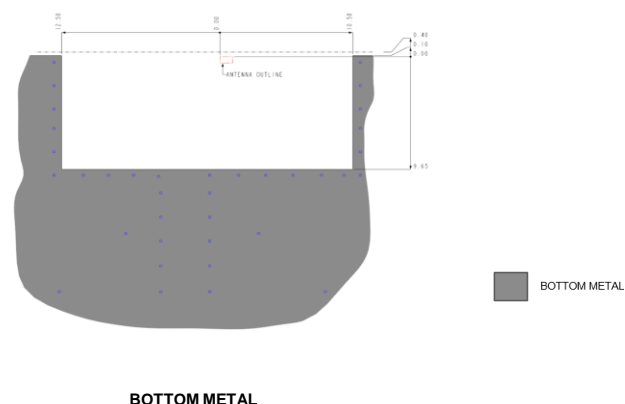
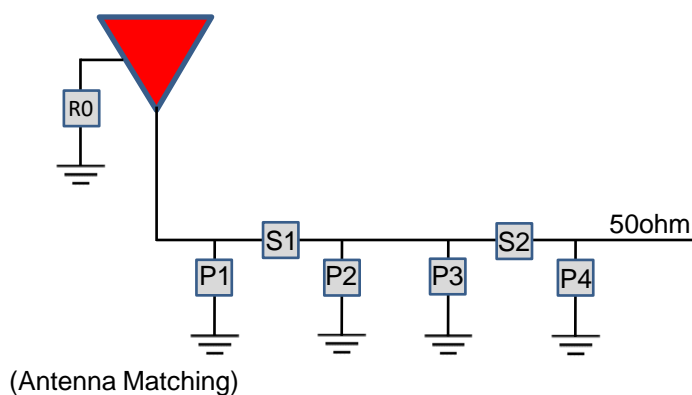
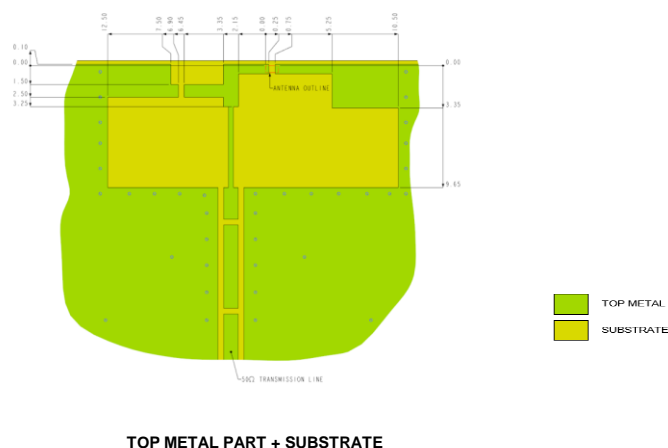


- Additional VIAS : Diam. 0.2mm to be placed around antenna, (no vias on transmission lines).
- Via holes must be covered by solder mask

Matching Pi Network

| R0 | P1 | S1 | P2 | P3 | S2 | P4 |
|--------|-----|------|--------|-----|------------|-----|
| 0.5 pF | DNI | 2 pF | 8.2 nH | DNI | 0 Ω | DNI |

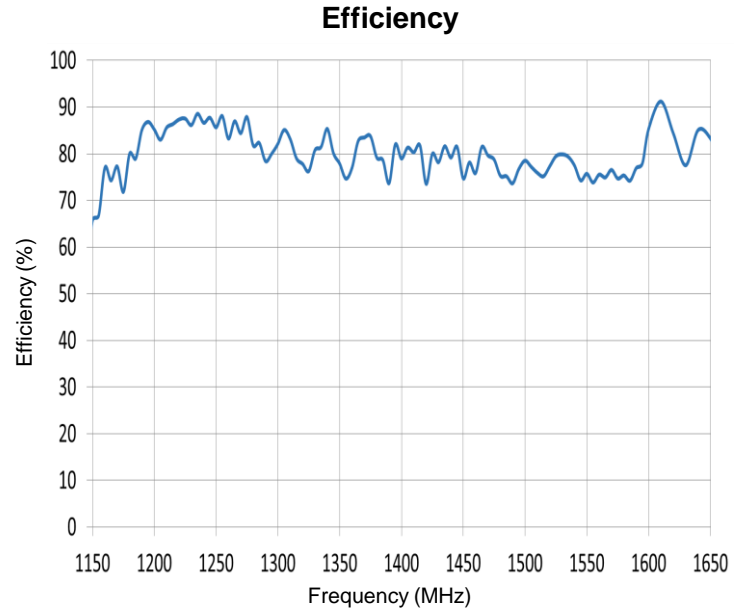
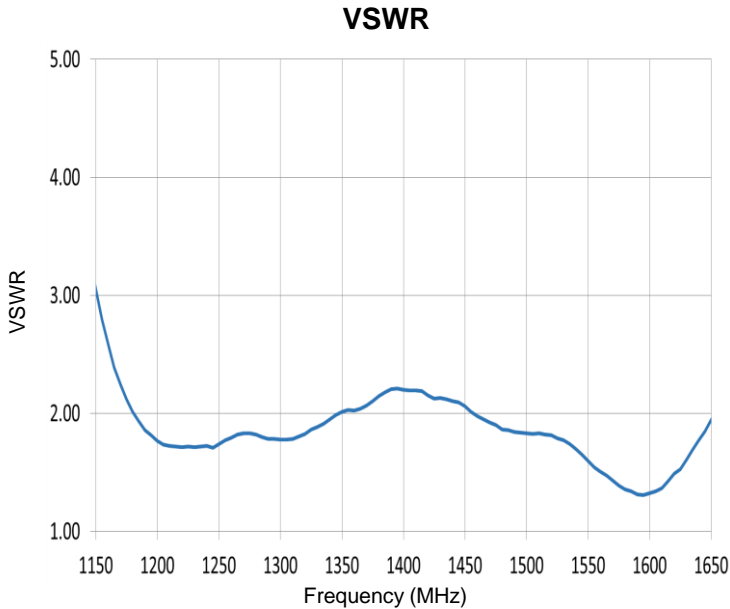
*Actual matching values depend on customer design



GNSS L1/L2/L5/L6 or GNSS KYOCERA AVX Embedded Chip Antenna Specifications
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

VSWR, Efficiency Plots (9002137-06)

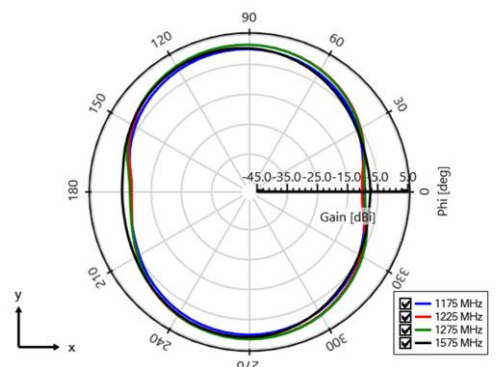
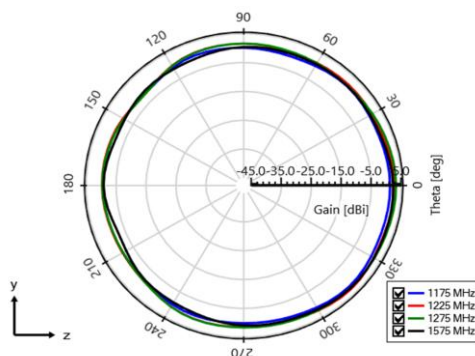
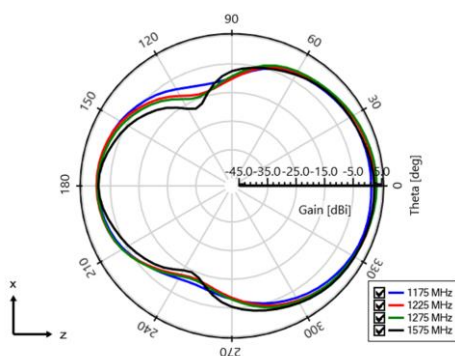
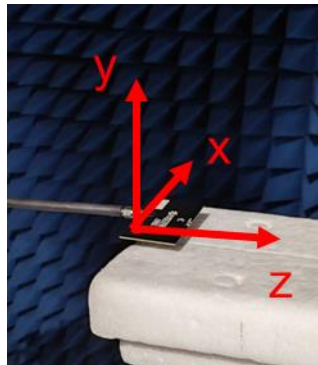
Typical performance on 90 x 40 mm PCB



Antenna Radiation Patterns (9002137-06)

Typical performance on 90 x 40 mm PCB

Measured @ 1175 MHz, 1225 MHz, 1275 MHz, 1575 MHz



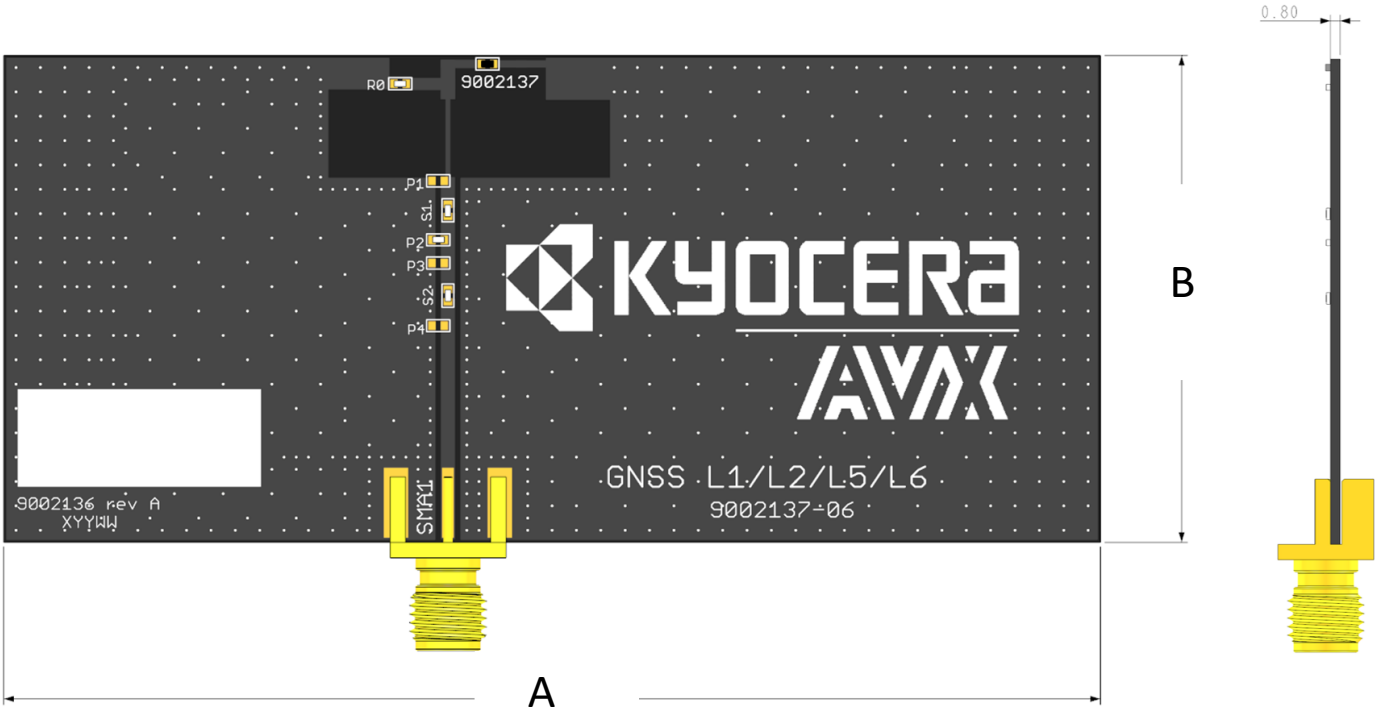
GNSS L1/L2/L5/L6 or GNSS KYOCERA AVX Embedded Chip Antenna Specifications
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

Antenna Demo Board

Typical layout dimensions (mm)

| Part Number | Description | A | B |
|-------------|----------------|------|------|
| 9002137-06 | L1, L2, L5, L6 | 90.0 | 40.0 |

9002137-06



Appendix 1

Appendix 1 gives instructions on how to achieve GNSS coverage (Beidou/GPS/Galileo/Glonass) using the 9002137-05 layout.

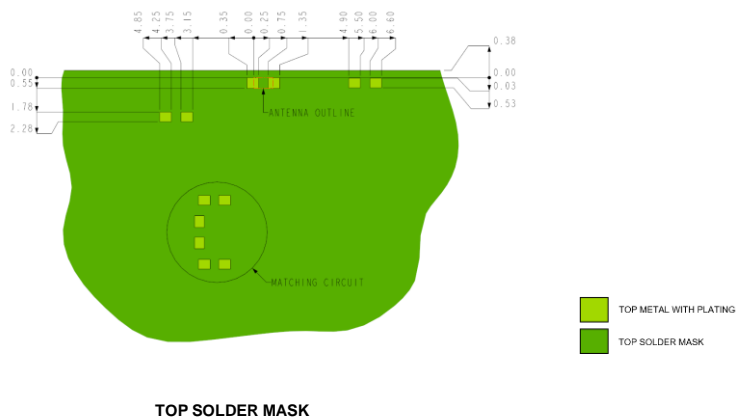
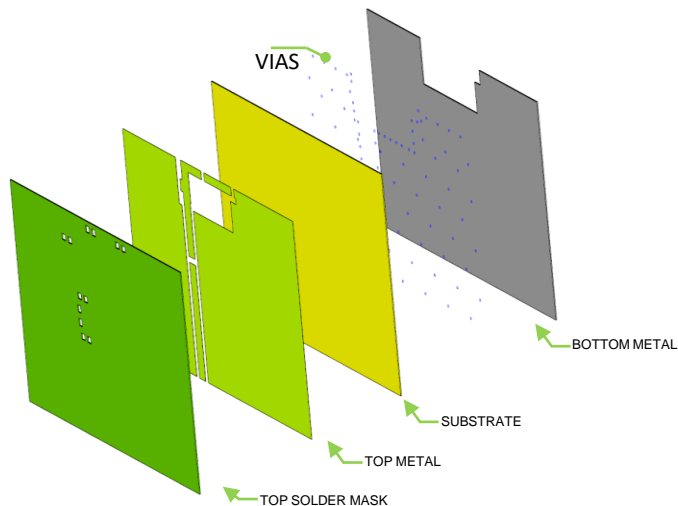
| Frequency (MHz) | 1560-1610 |
|----------------------|------------------------|
| Peak Gain | 2.0 dBi |
| Average Efficiency | 65% |
| VSWR Match | < 2.0:1 |
| Polarization | Linear |
| Power Handling | 0.5 Watt CW |
| Feed Point Impedance | 50 Ω unbalanced |

*Data shown above has Appendix 1 matching applied on 80 x 40 mm PCB.

GNSS L1/L2/L5/L6 or GNSS KYOCERA AVX Embedded Chip Antenna Specifications
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

Layout (9002137-05)

Typical antenna dimensions (mm)

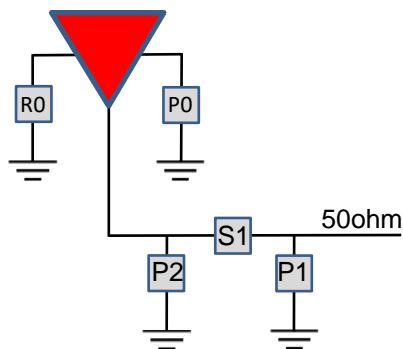


- Additional VIAS : Diam. 0.2mm to be placed around antenna, (no vias on transmission lines).
- Via holes must be covered by solder mask

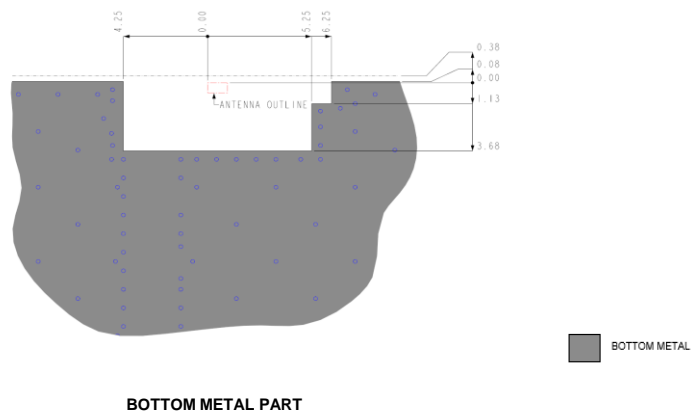
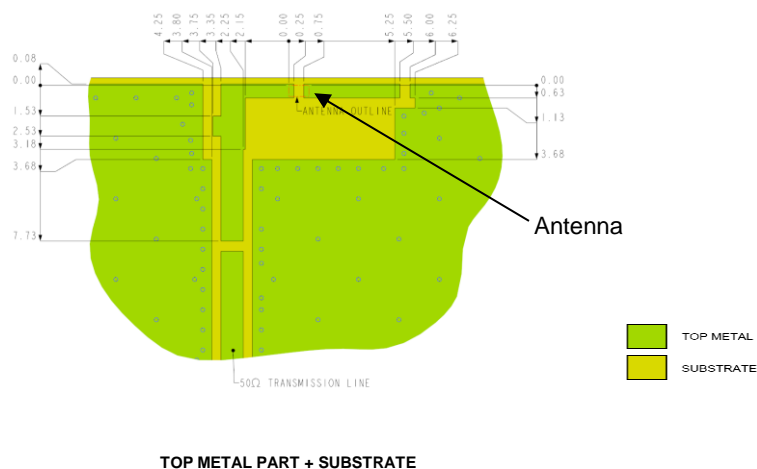
Matching Pi Network

| P0 | R0 | P1 | S1 | P2 |
|-------|------|-----|------------|-----|
| 82 pF | 1 nH | DNI | 0 Ω | DNI |

*Actual matching values depend on customer design



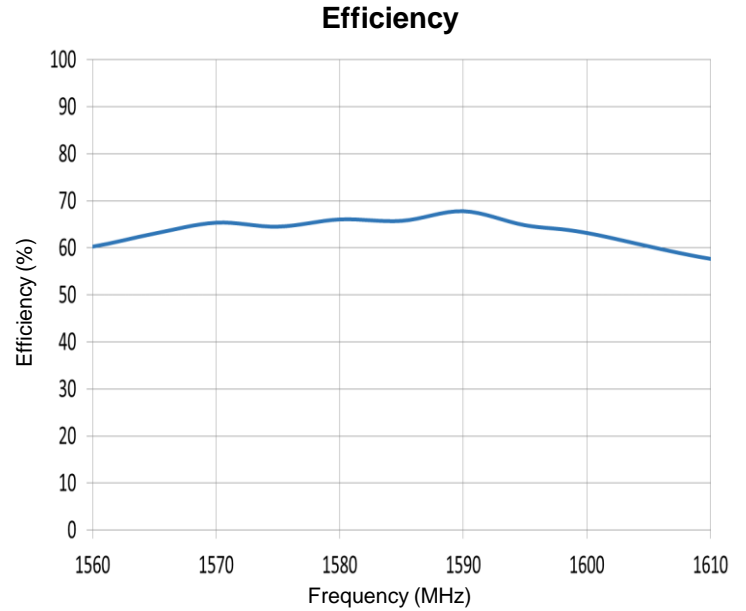
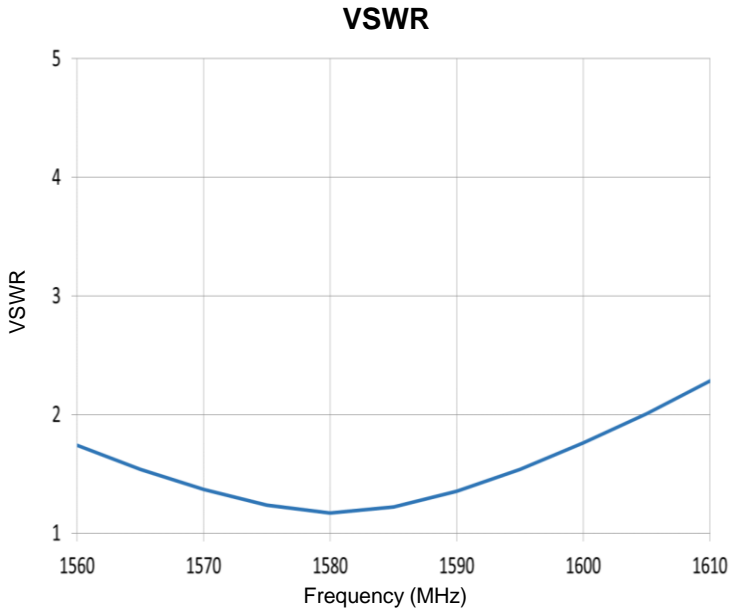
(Antenna Matching)



GNSS L1/L2/L5/L6 or GNSS KYOCERA AVX Embedded Chip Antenna Specifications
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

VSWR, Efficiency Plots (9002137-05)

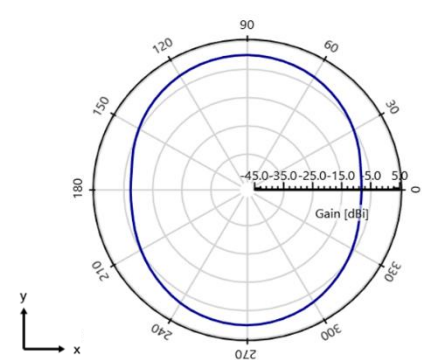
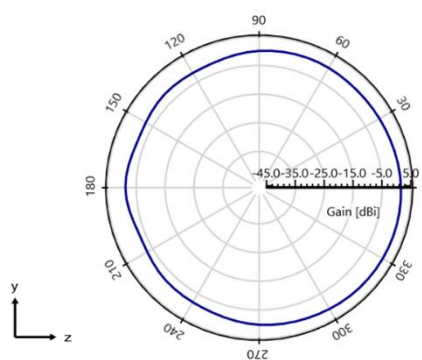
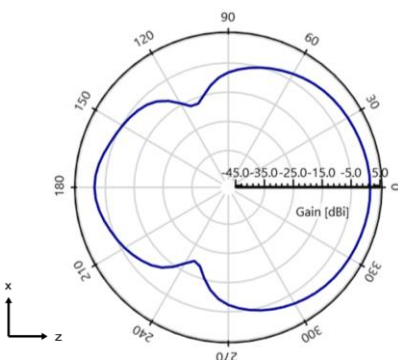
Typical performance on 80 x 40 mm PCB



Antenna Radiation Patterns (9002137-05)

Typical performance on 80 x 40 mm PCB

Measured @ 1575 MHz

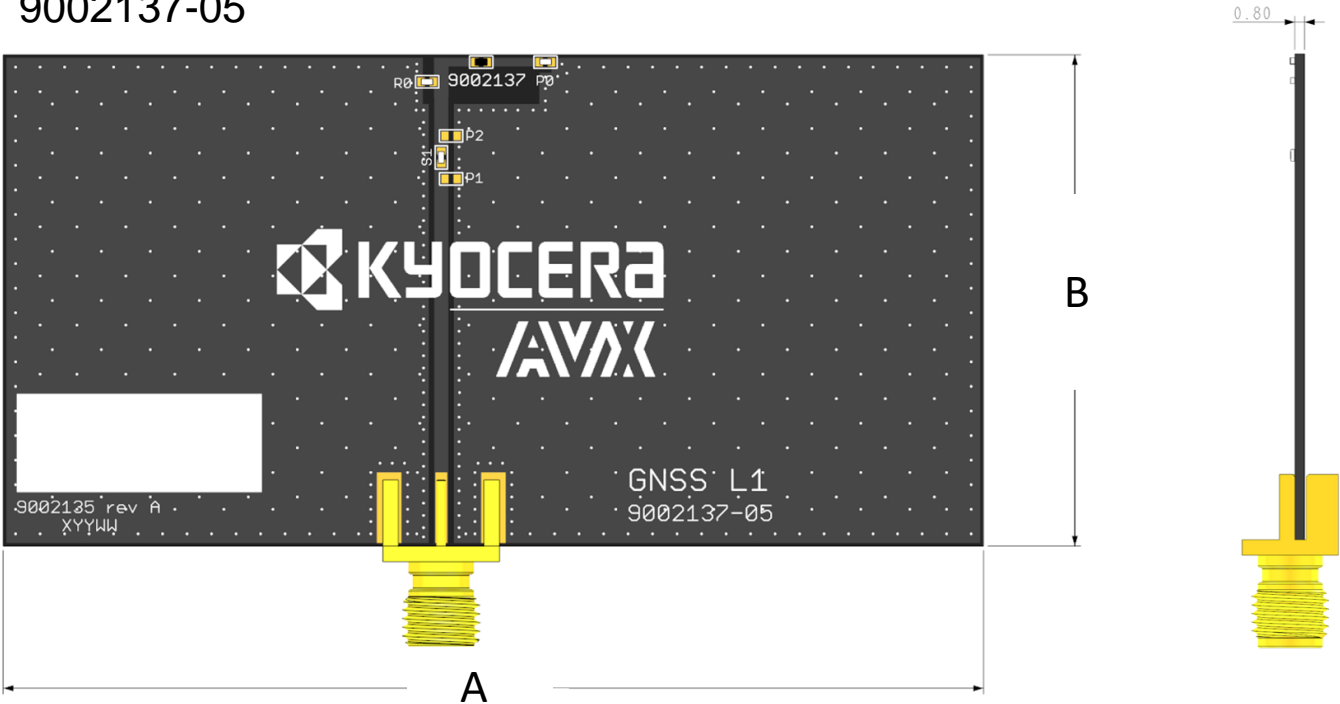


GNSS L1/L2/L5/L6 or GNSS KYOCERA AVX Embedded Chip Antenna Specifications
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

Antenna Demo Board (9002137-05)
Typical layout dimensions (mm)

| Part Number | Description | A | B |
|-------------|--------------------------------------|------|------|
| 9002137-05 | GNSS (Beidou/GPS/Galileo/Glonass) | 80.0 | 40.0 |

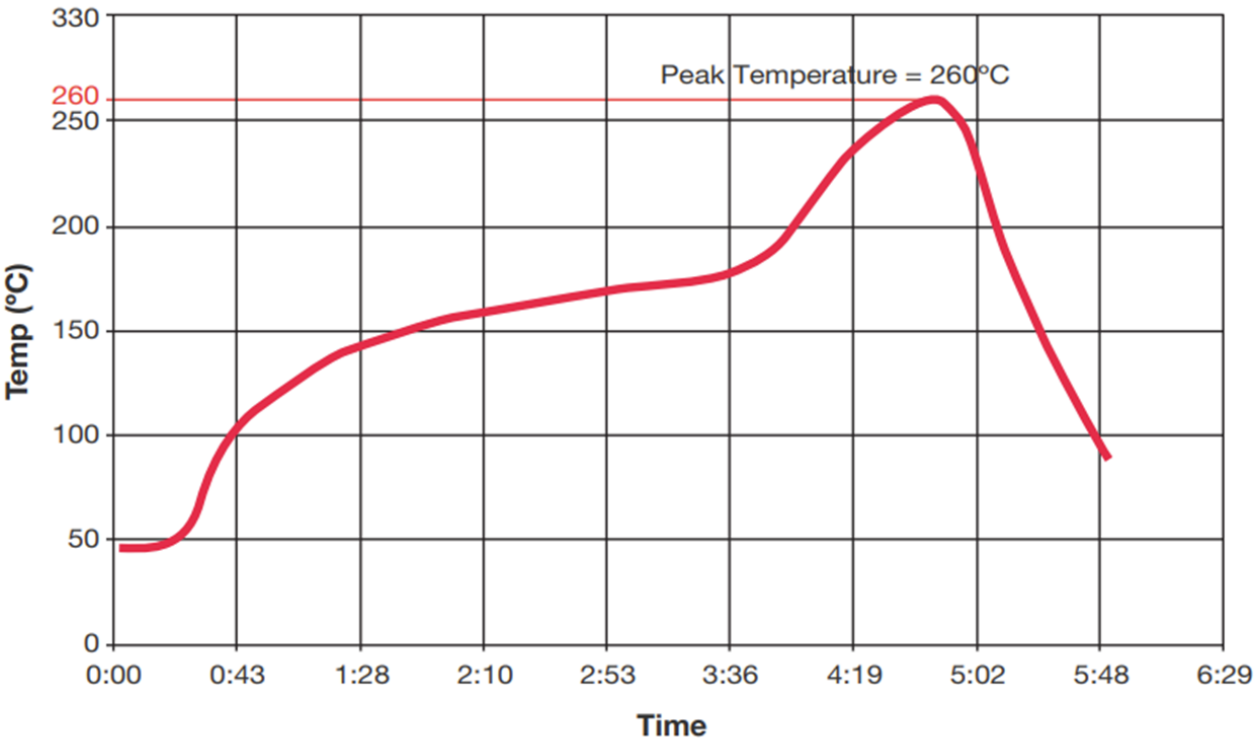
9002137-05



GNSS L1/L2/L5/L6 or GNSS KYOCERA AVX Embedded Chip Antenna Specifications
 KYOCERA AVX 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 LDS antenna:



GNSS L1/L2/L5/L6 or GNSS KYOCERA AVX Embedded Chip Antenna Specifications

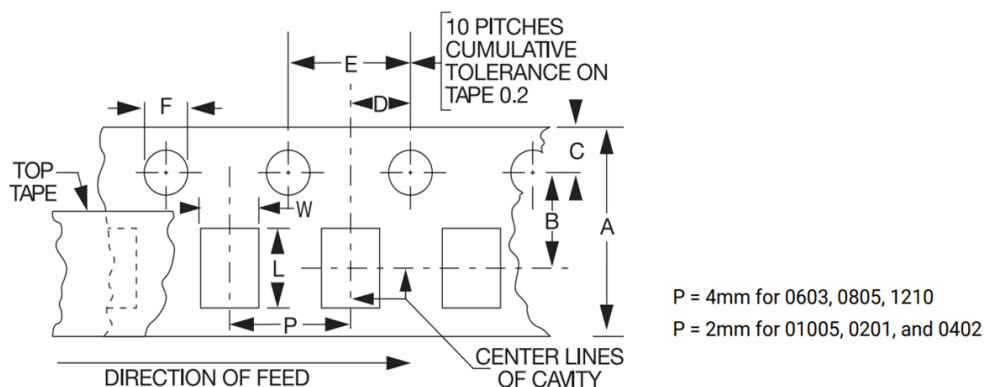
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

Packaging

CARRIER DIMENSIONS: millimeters (inches)

| A | B | C | D | E | F |
|------------------------------|-------------------------------|-------------------------------|-------------------------------|------------------------------|--|
| 8.0 ± 0.3 (0.315 ± 0.012) | 3.5 ± 0.05 (0.138 ± 0.002) | 1.75 ± 0.1 (0.069 ± 0.004) | 2.0 ± 0.05 (0.079 ± 0.002) | 4.0 ± 0.1 (0.157 ± 0.004) | (1.5 ^{+0.1} _{-0.0}) (0.059 ^{+0.004} _{-0.000}) |

The nominal dimensions of the component compartment (W,L) are derived from the component size.



GNSS L1/L2/L5/L6 or GNSS KYOCERA AVX Embedded Chip Antenna Specifications
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

Additional Resources – 9002137-06 Ultra-Small GNSS L1 / L2 / L5 / L6 Chip Antenna

DXF File:

https://www.kyocera-avx.com/download/antennas/3D-DXF/9002137-06-GNSS-L1-L2-L5-L6_3D-DXF.zip

Simulation Files:

HFSS: [https://www.kyocera-avx.com/download/antennas/ansys-hfss/9002137_\(Antenna&EVB-06\)_HFSS_051024.zip](https://www.kyocera-avx.com/download/antennas/ansys-hfss/9002137_(Antenna&EVB-06)_HFSS_051024.zip)

CST : [https://www.kyocera-avx.com/download/antennas/CST/9002137_\(Antenna&EVB-06\)_CST_051024.zip](https://www.kyocera-avx.com/download/antennas/CST/9002137_(Antenna&EVB-06)_CST_051024.zip)

Additional Resources – 9002137-05 Ultra-Small GPS / GLONASS / Beidou / Galileo Chip Antenna

DXF File:

https://www.kyocera-avx.com/download/antennas/3D-DXF/9002137-05-GNSS-L1_3D-DXF.zip

Simulation Files:

HFSS : [https://www.kyocera-avx.com/download/antennas/ansys-hfss/9002137_\(Antenna&EVB-05\)_HFSS_050624.zip](https://www.kyocera-avx.com/download/antennas/ansys-hfss/9002137_(Antenna&EVB-05)_HFSS_050624.zip)

CST : [https://www.kyocera-avx.com/download/antennas/CST/9002137_\(Antenna&EVB-05\)_CST_051024.zip](https://www.kyocera-avx.com/download/antennas/CST/9002137_(Antenna&EVB-05)_CST_051024.zip)