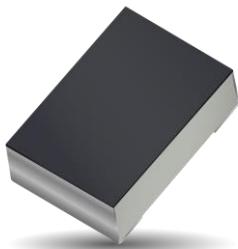


Part No. 9002137

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
- Telematics
- POS, Headsets, Tablets
- Tracking
- Healthcare (FDA Class I)
- Gateway, Access Point
- M2M, Industrial devices
- Handheld
- 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	
VSWR Match	1.5:1 max	1.7:1 max	2.0:1 max	1.8:1 max	Refer to Appendix 1
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 / ≤ 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°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

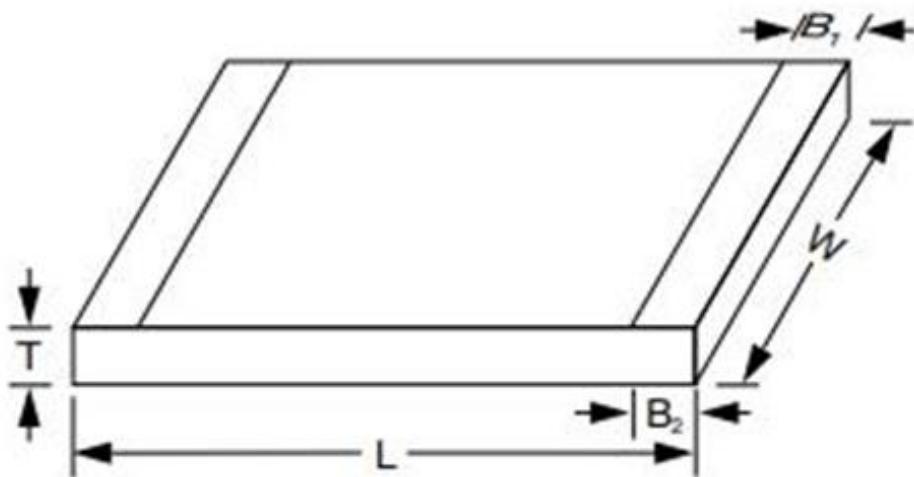
GNSS L1/L2/L5/L6 or GNSS KYOCERA AVX Embedded Chip Antenna Specifications
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

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

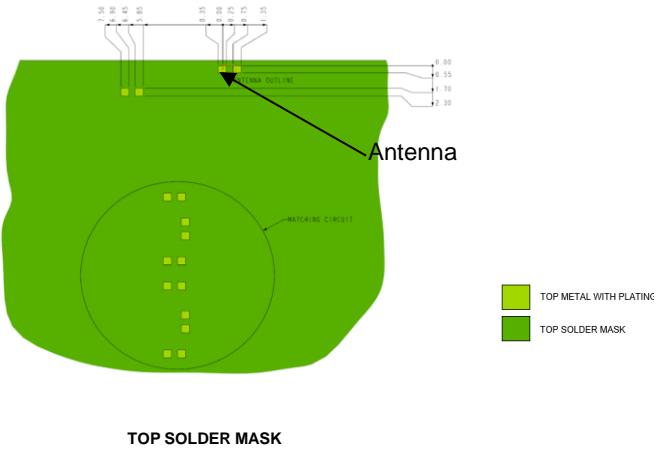
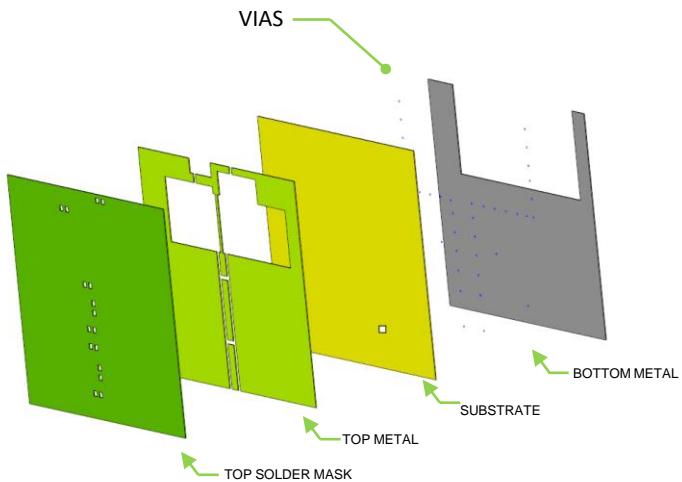
*Mount Black Side up



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)

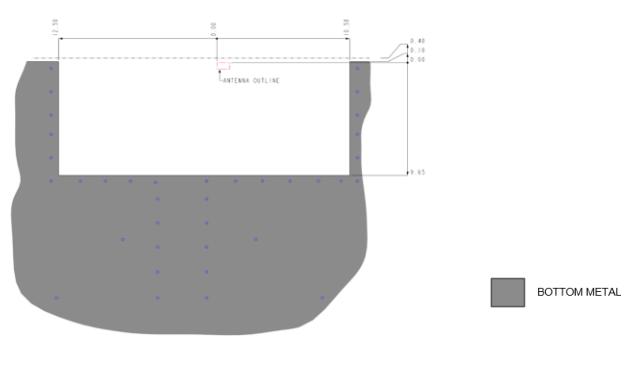
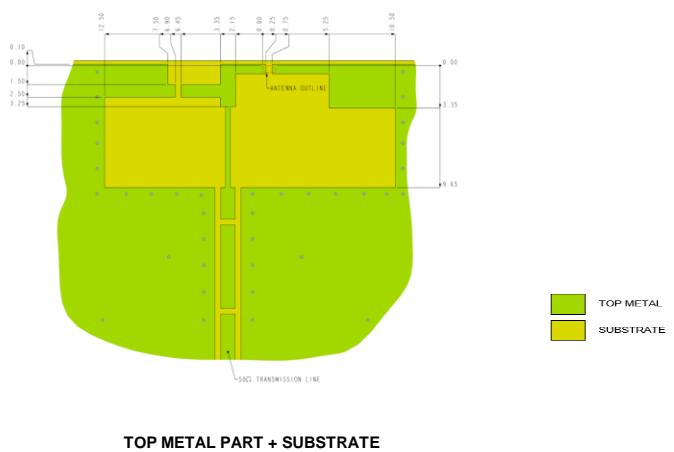
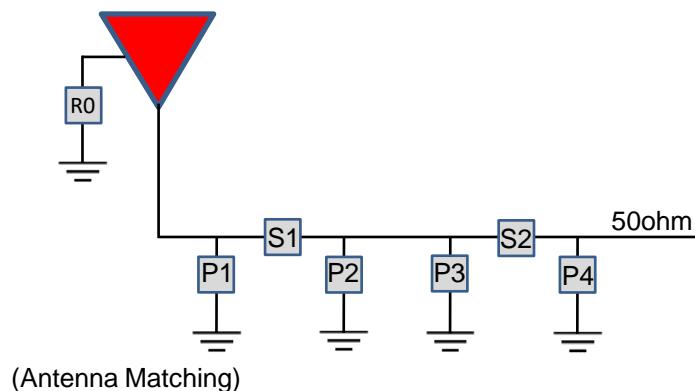


- Additional VIAS : Diam. 0.2mm to be placed around antenna, (no vias on transmission lines).
 - Via holes must be covered by solder mask

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

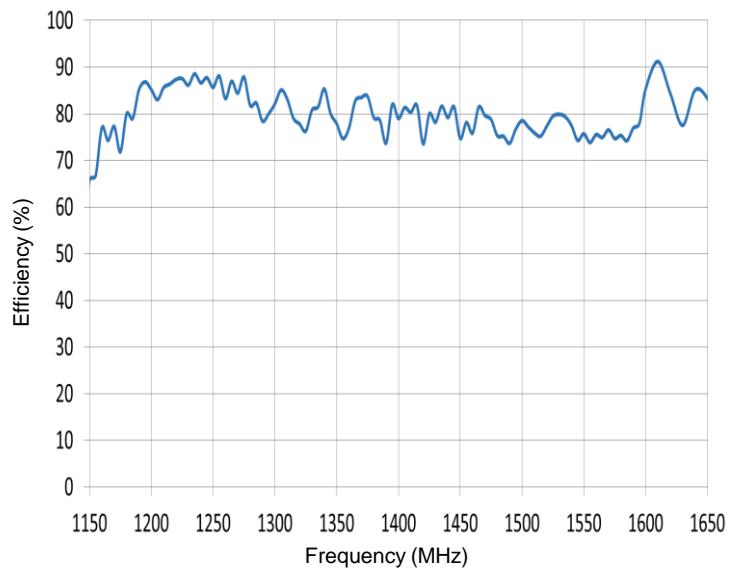
VSWR, Efficiency Plots (9002137-06)

Typical performance on 90 x 40 mm PCB

VSWR



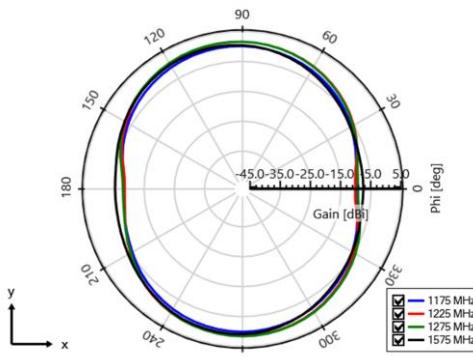
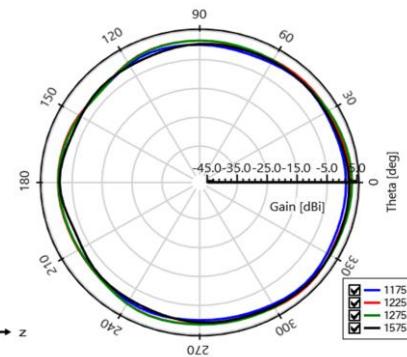
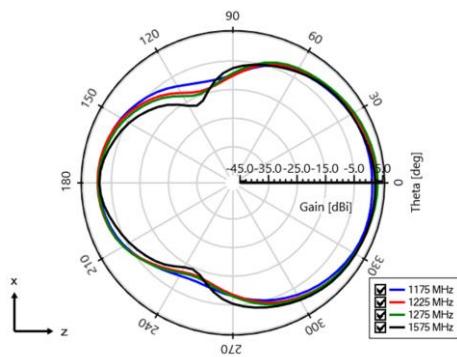
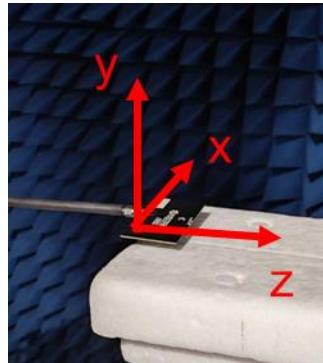
Efficiency



Antenna Radiation Patterns (9002137-06)

Typical performance on 90 x 40 mm PCB

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



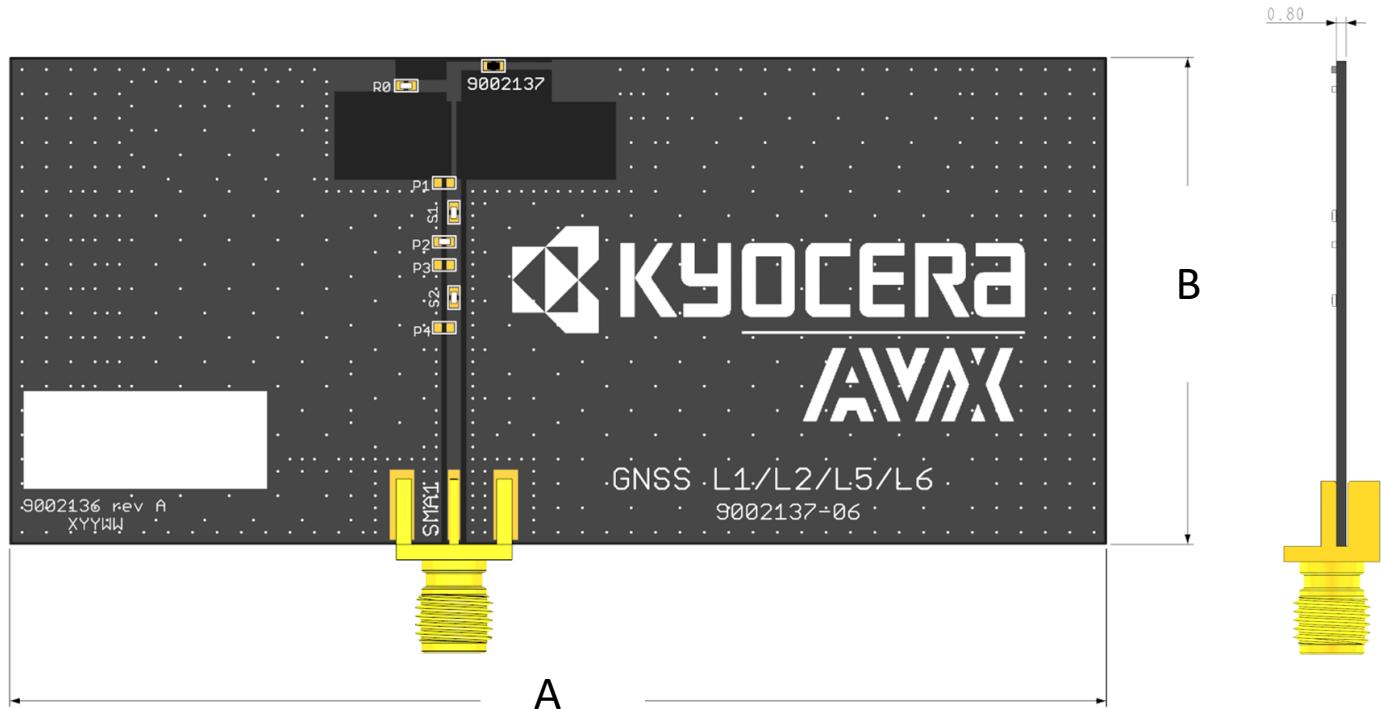
GNSS L1/L2/L5/L6 or GNSS KYOCERA AVX Embedded Chip Antenna Specifications
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

Antenna Demo Board

Typical layout dimensions (mm)

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

9002137-06



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

Appendix 1

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

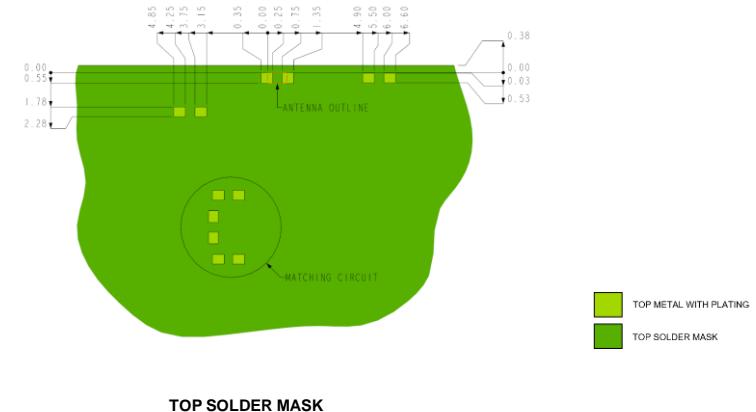
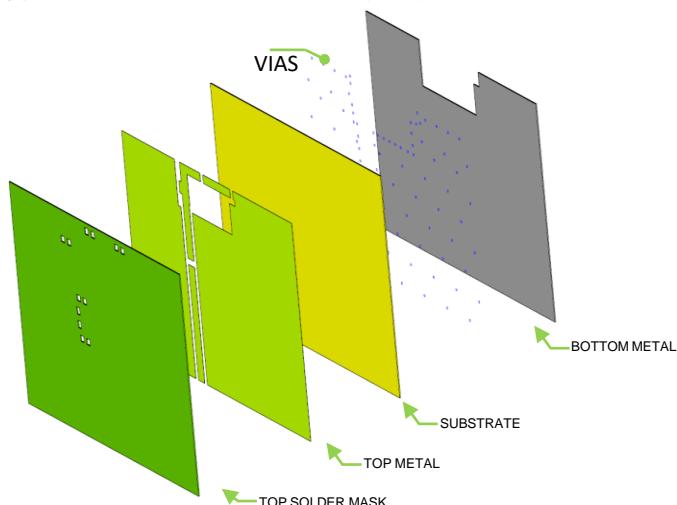
Frequency (MHz)	1560-1610
Peak Gain	2.0 dBi
Average Efficiency	65%
VSWR Match	< 2.0:1
Polarization	Linear
Power Handling	0.5 Watt CW
Feed Point Impedance	50 Ω unbalanced

*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)

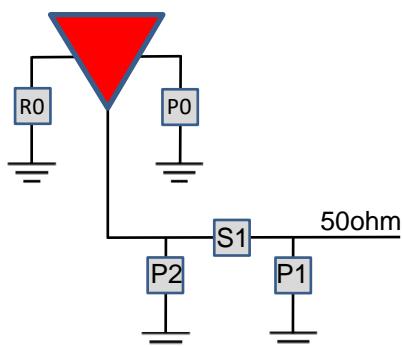


- Additional VIAS : Diam. 0.2mm to be placed around antenna, (no vias on transmission lines).
- Via holes must be covered by solder mask

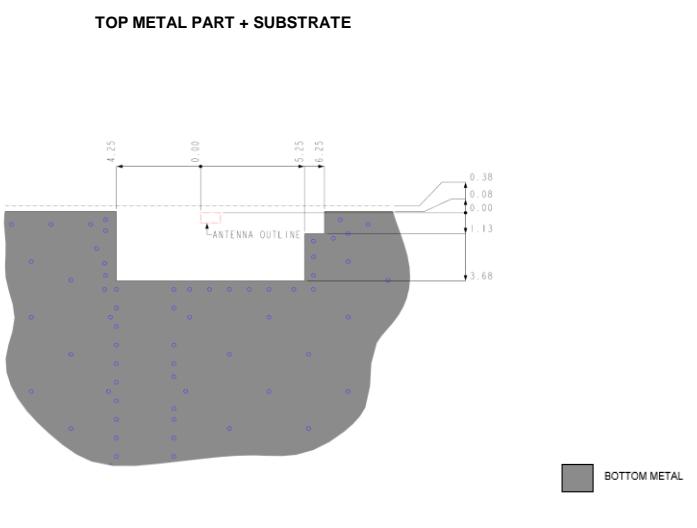
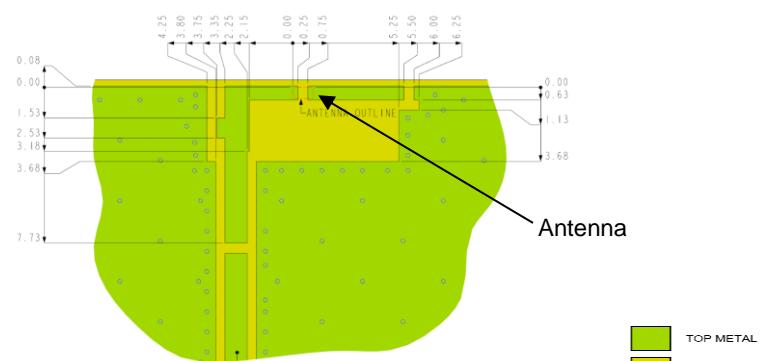
Matching Pi Network

P0	R0	P1	S1	P2
82 pF	1 nH	DNI	0 Ω	DNI

*Actual matching values depend on customer design



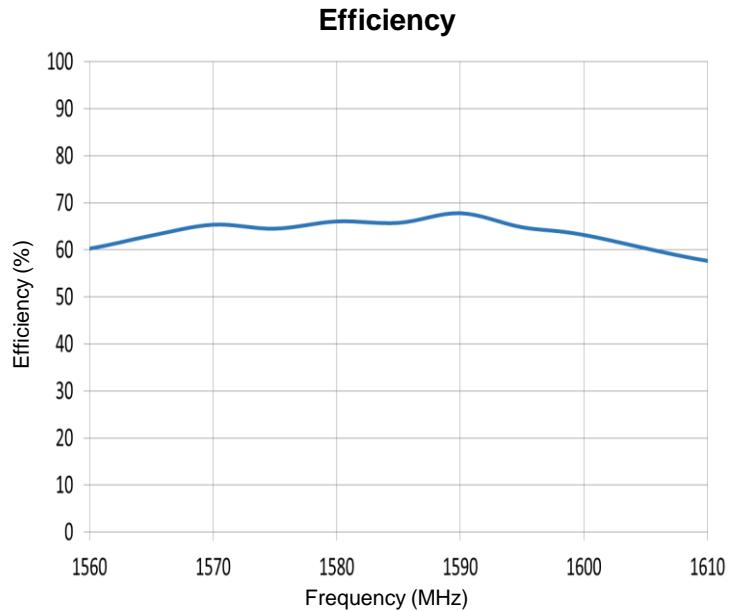
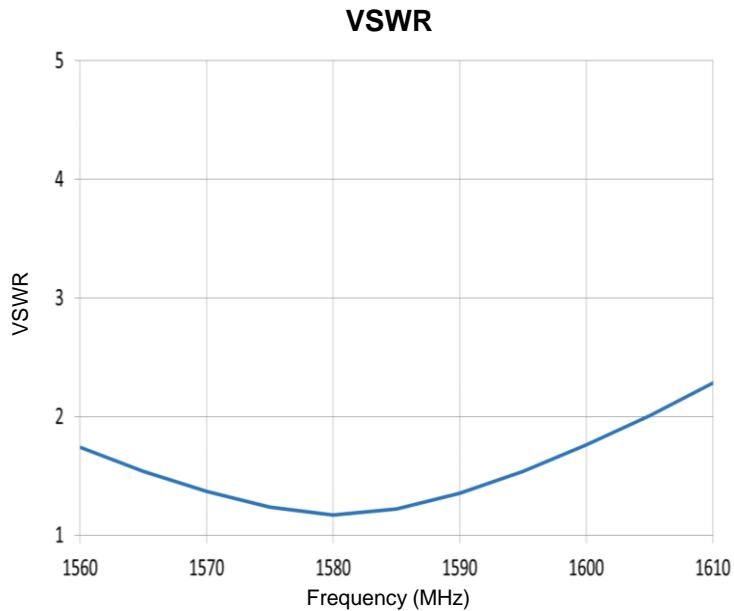
(Antenna Matching)



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)

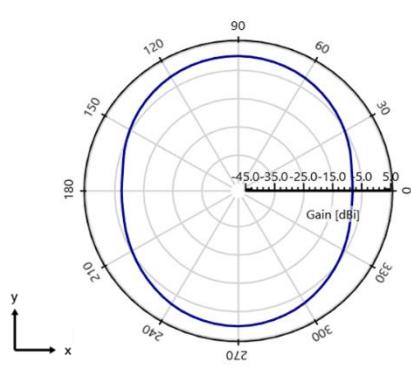
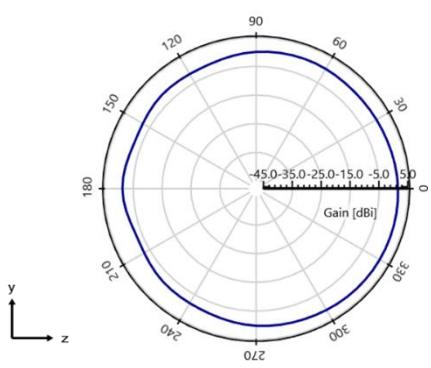
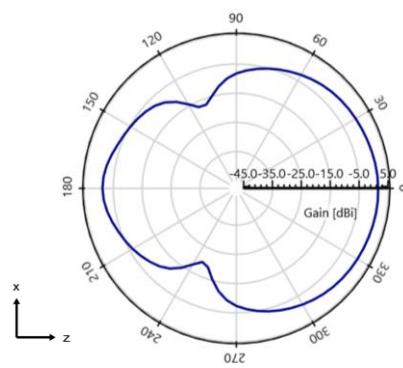
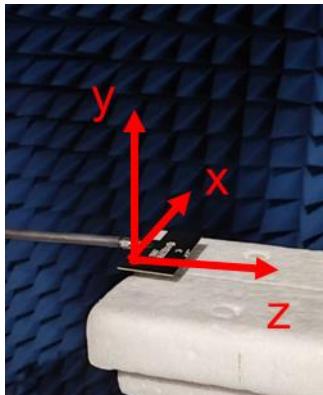
Typical performance on 80 x 40 mm PCB



Antenna Radiation Patterns (9002137-05)

Typical performance on 80 x 40 mm PCB

Measured @ 1575 MHz



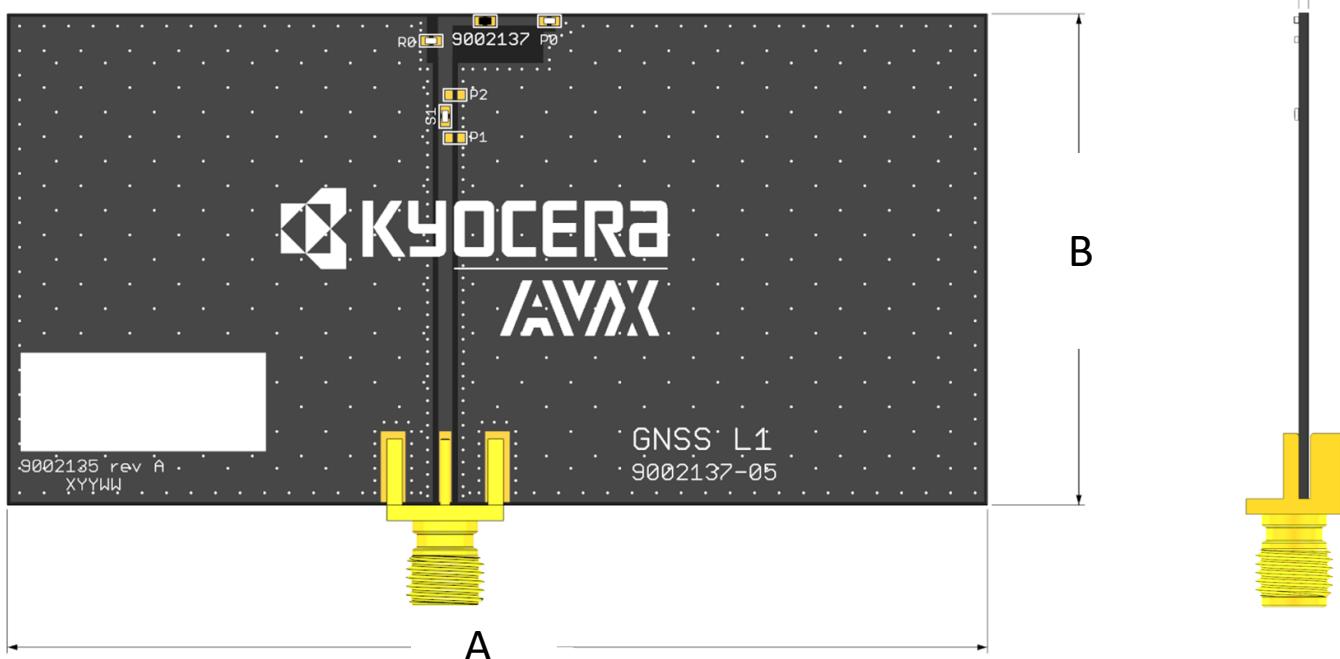
GNSS L1/L2/L5/L6 or GNSS KYOCERA AVX Embedded Chip Antenna Specifications
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

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

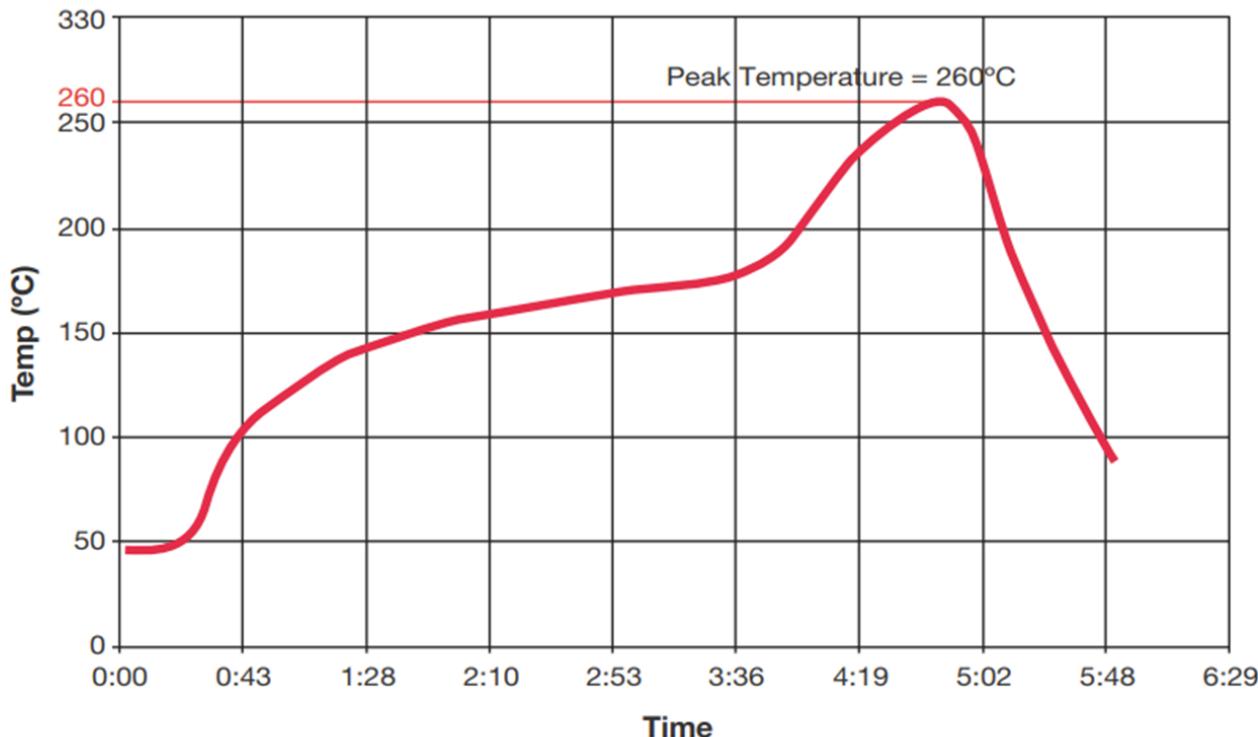
9002137-05



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:



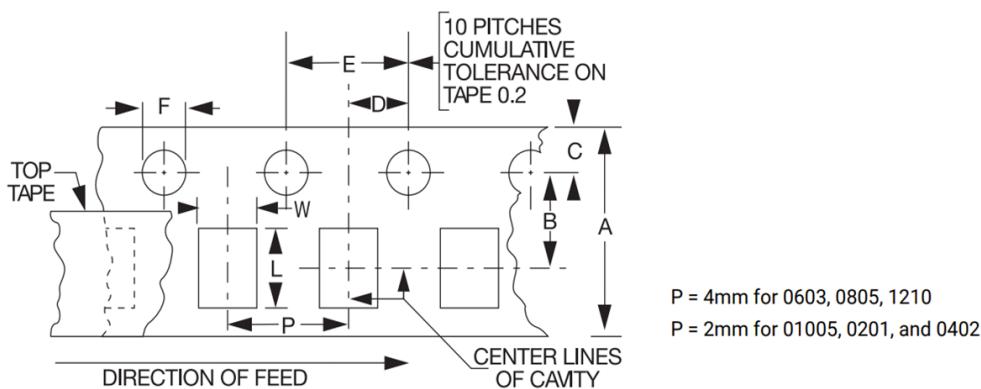
GNSS L1/L2/L5/L6 or GNSS KYOCERA AVX Embedded Chip Antenna Specifications
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

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)	$(1.5)^{+0.1}_{-0.0}$ ($0.059^{+0.004}_{-0.002}$)

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)