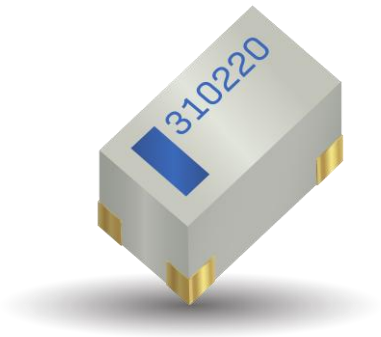
Part No. M310220
Wi-Fi / BT / Zigbee or S-Band Ceramic Antenna

2.4 GHz ; 1980 – 2020 / 2170 – 2200 MHz

Supports: Wi-Fi applications, Bluetooth, Zigbee, WLAN, Satellite IoT



KYOCERA AVX's 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 Bluetooth® enabled cell phones, media players and other mobile devices. Also covers S-Band for Satellite IoT applications.

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's' antennas utilize patented IMD technology to deliver a unique size and performance combination.

Greater Flexibility

KYOCERA AVX's first-in-class IMD technology enables you to develop concept designs that are more advanced and that deliver superior performance in reception critical applications.

Ceramic Wi-Fi / Bluetooth Antenna or S-Band

2400 – 2485 MHz (Wi-Fi/BT)
1980 – 2020 MHz (S-Band)
2170 – 2200 MHz (S-Band)

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.

Environmental Compliance

Products are the latest RoHS version compliant.

APPLICATIONS

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

Electrical Specifications

Typical performance on 40 x 60 mm PCB

Frequency (MHz)	2400 – 2485	1980-2020	2170-2200
Peak Gain	1.7 dBi	Refer to Appendix 1	Refer to Appendix 1
Average Efficiency	67%		
VSWR Match	2.0:1 max		
Feed Point Impedance	50 ohms unbalanced		
Polarization	Linear		
Power Handling	0.5 Watt CW		
Additional Resources	Download Application Note and Simulation Files		

Mechanical Specifications & Ordering Part Number

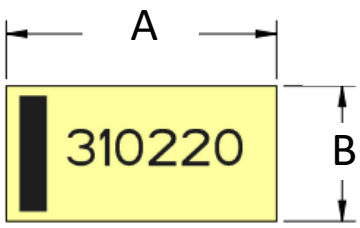
Ordering Part Number	M310220
Size (mm)	3.00 x 1.50 x 1.08
Mounting	Surface mounted
Weight (grams)	0.1
Packaging	Tape & Reel, M310220 – 1,000 pieces per reel
Demo Board	M310220-01 (2.4 GHz) M310220-03 (S-band)
Additional Resources	Download DXF, Gerber and 3D FIT Files

2.4 GHz KYOCERA AVX's Embedded Antenna Specifications
KYOCERA AVX's produces a wide variety of standard and custom antennas to meet user needs.

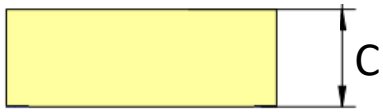
Antenna Dimensions

Typical antenna dimensions (mm)

Part Number	A (mm)	B (mm)	C (mm)
M310220	3.00 ± 0.2	1.50 ± 0.2	1.08 ± 0.1

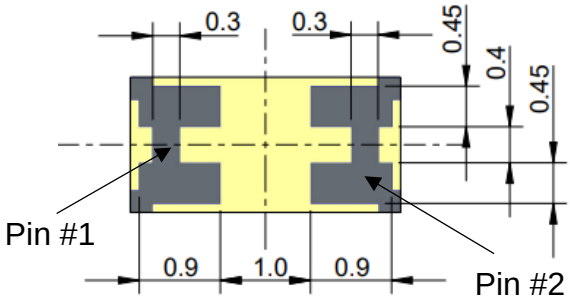


TOP VIEW



FRONT VIEW

Pin	Description
1	Feed
2	Ground



BOTTOM VIEW

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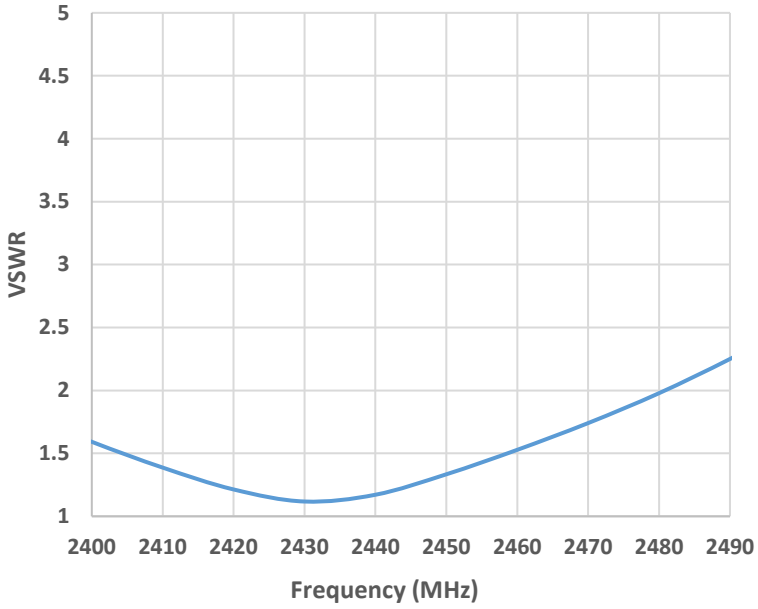
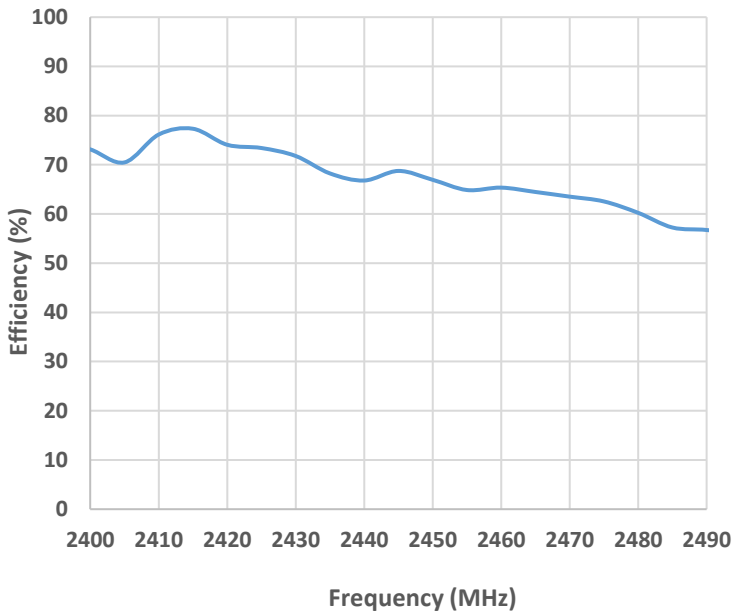
VSWR, Efficiency Plots

Typical performance on 40 x 60 mm PCB

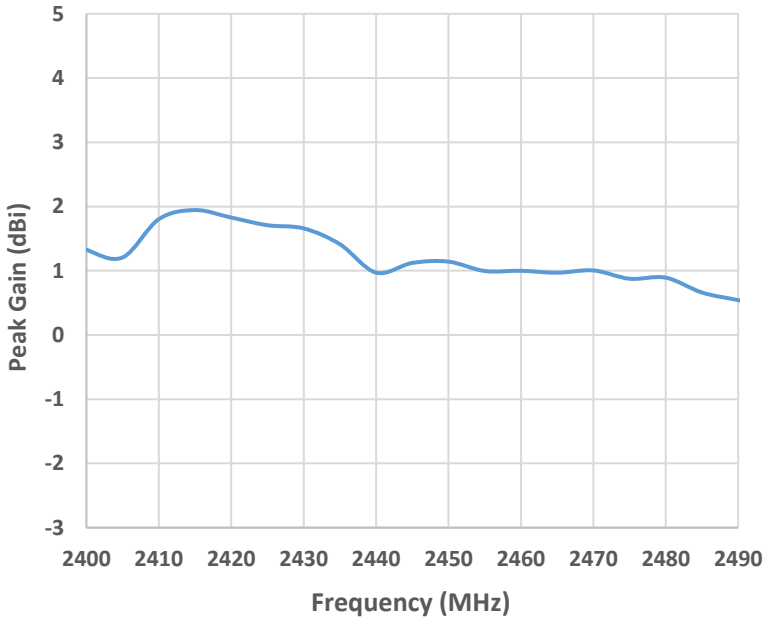
VSWR (2400 – 2490 MHz)



Efficiency (2400 – 2490 MHz)



Peak Gain (2400 – 2490 MHz)



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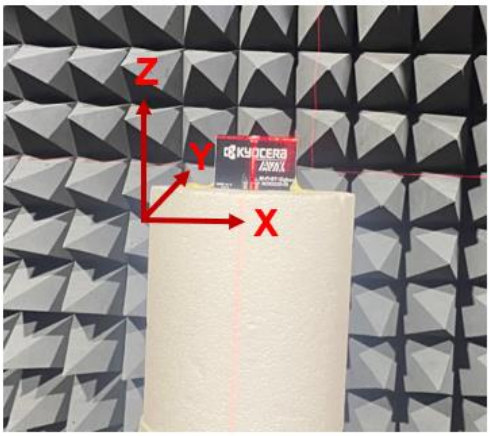
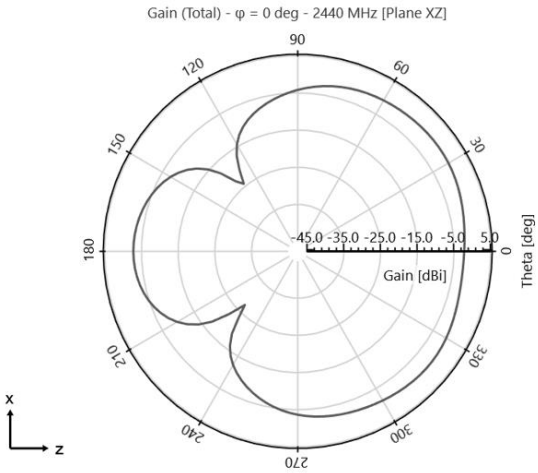
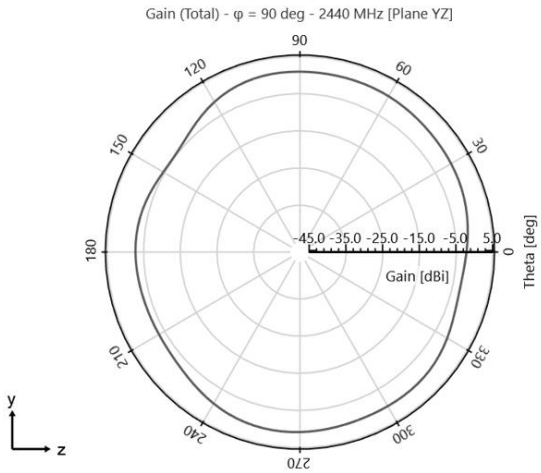
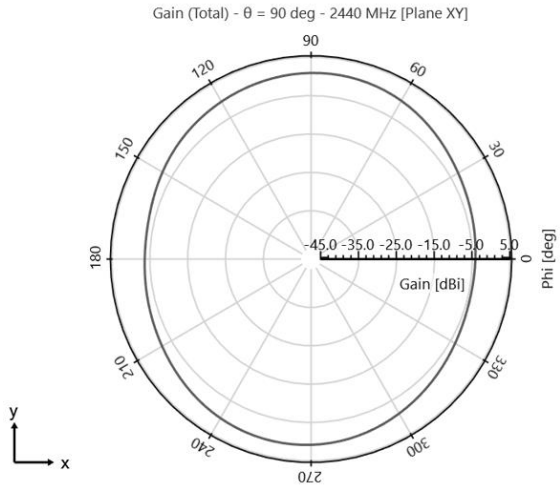
Antenna Radiation Patterns

Typical performance on 40 x 60 mm PCB
Measured @ 2440 MHz









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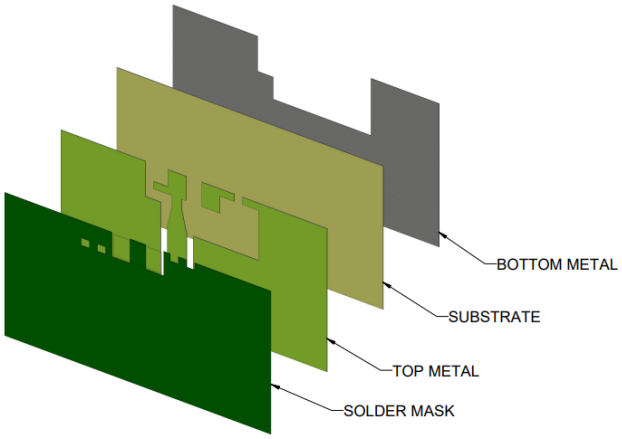
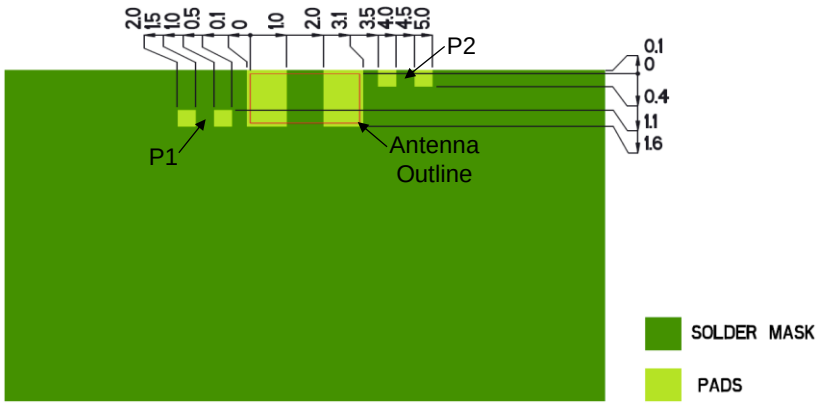
Antenna Layout

Typical layout dimensions (mm)

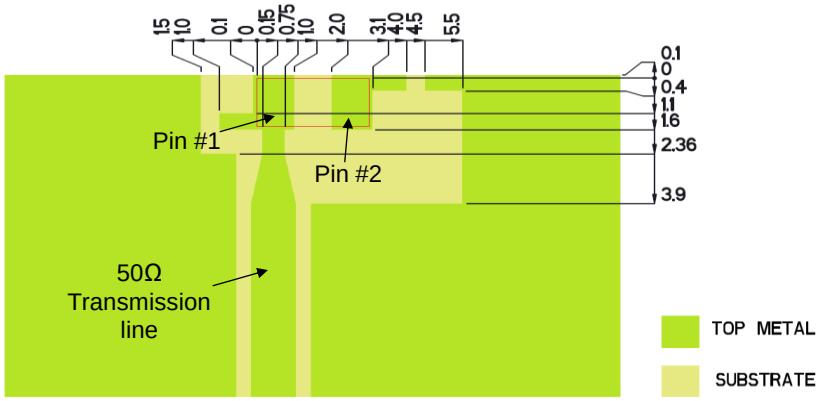




- Additional VIAS: Diam. 0.2mm to be placed around antenna, (no vias on transmission lines).
- Via holes must be covered by solder mask

Pin Descriptions

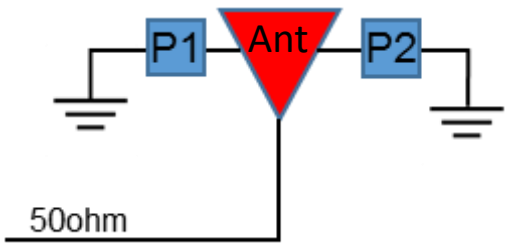
Pin#	Description
1	Feed
2	Ground

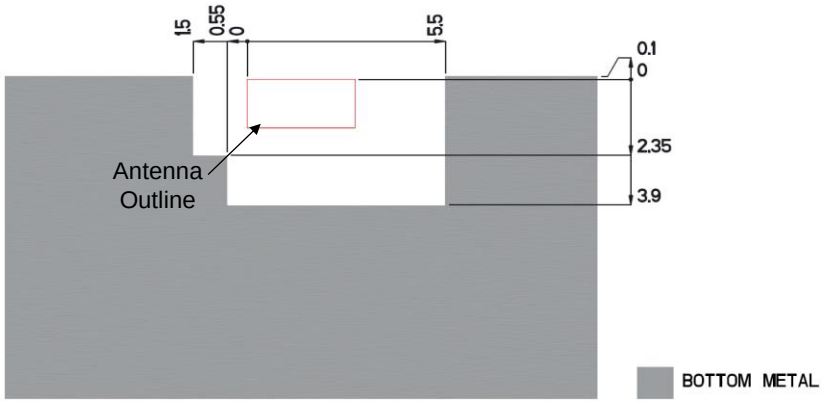


Matching Network (Demo Board)

Component	Value	KYOCERA AVX Part Number	Tolerance
P1	5.1pF	04023J5R1ABSTR	±0.05pF
P2	2.7pF	04023J2R7ABSTR	±0.05pF

*Actual matching values depend on customer design





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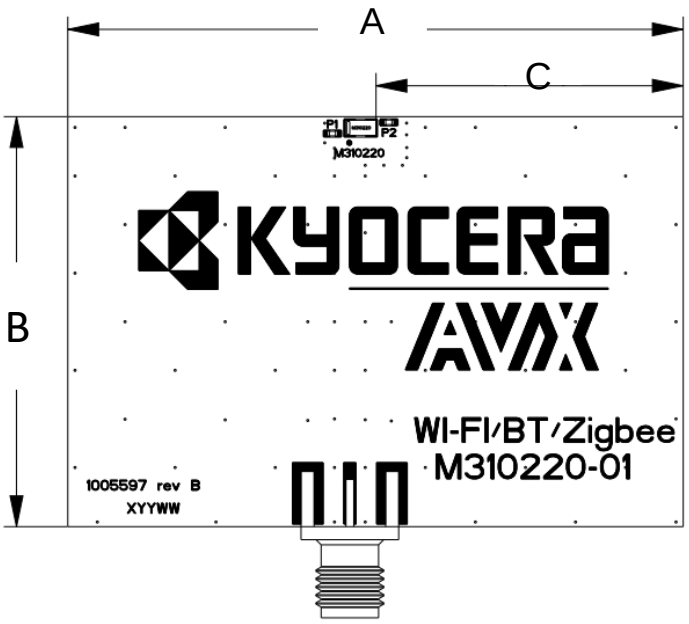
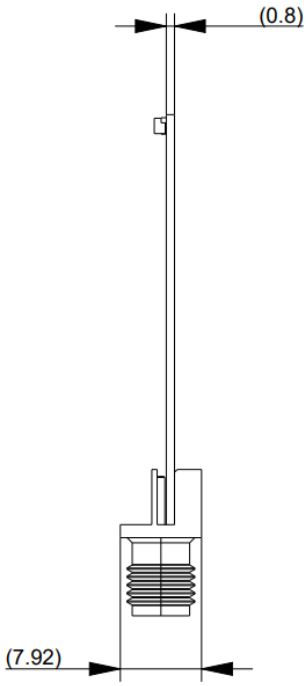
Antenna Demo Board

Typical layout dimensions (mm)

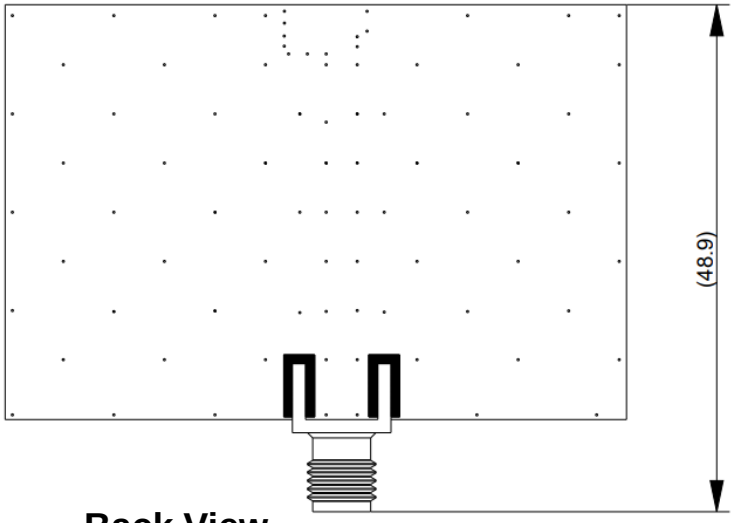
Part Number	A (mm)	B (mm)	C (mm)
M310220-01	60.0	40.0	30.0



Front View



Side View



Back View

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Appendix 1

Appendix 1 gives instructions on how to achieve the S-Band (1980 – 2020 MHz, 2170 – 2200 MHz)

Electrical Specifications

Typical Characteristics, using 60 x 40 mm PCB.

Bands (MHz)	1980-2020	2170-2200
Average Efficiency	40%	40%
Return Loss	< - 8dB	< - 5dB
Power handling	0.5 Watt CW	0.5 Watt CW
Feed Point Impedance	50Ω unbalanced	
Polarization	Linear	
Radiation Pattern	Omni-directional	

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S-Band KYOCERA AVX's Embedded Antenna Specifications
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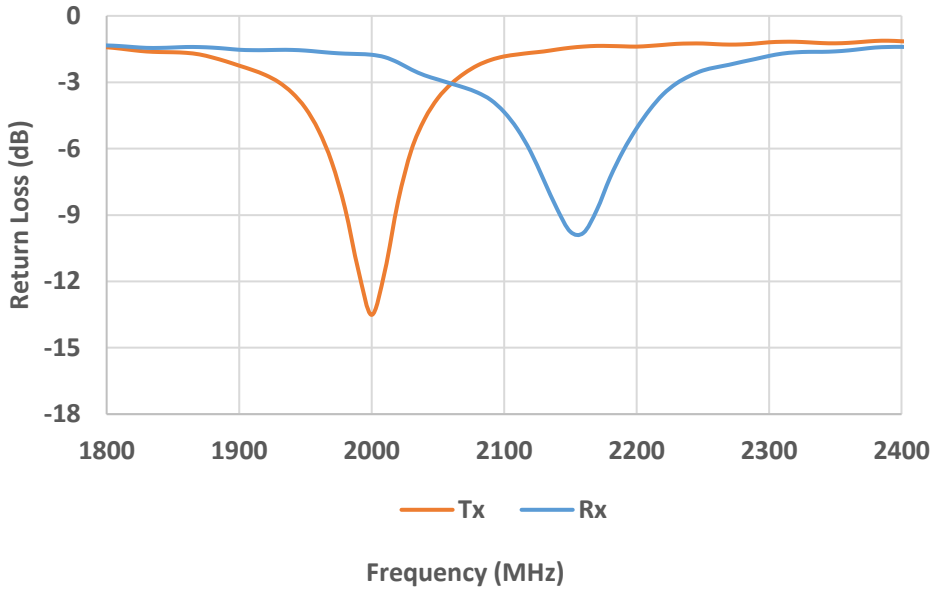
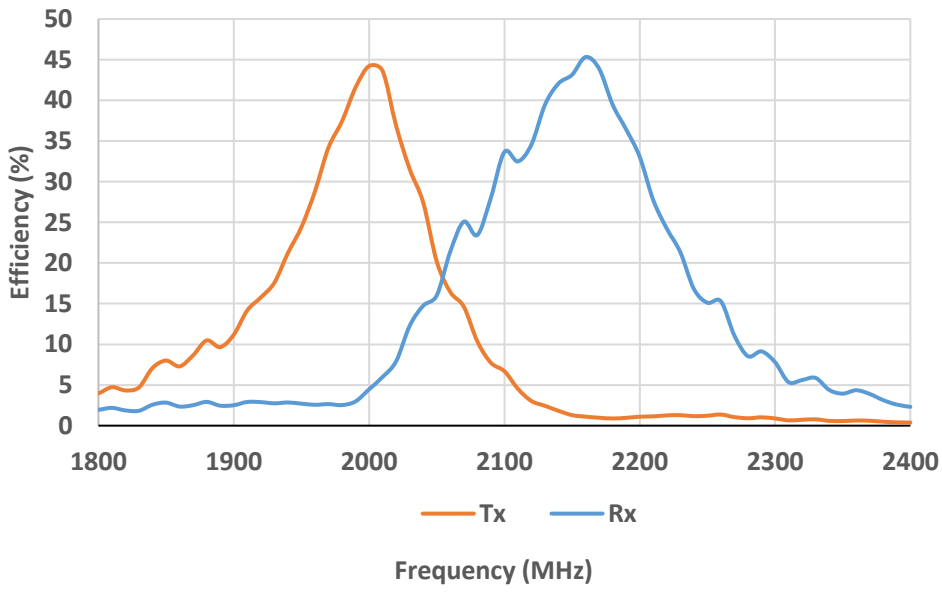
Return Loss, Efficiency Data

Typical M310220 performance dimensions (mm)

Return Loss (1980-2200 MHz)



Efficiency Data (1980-2200 MHz)



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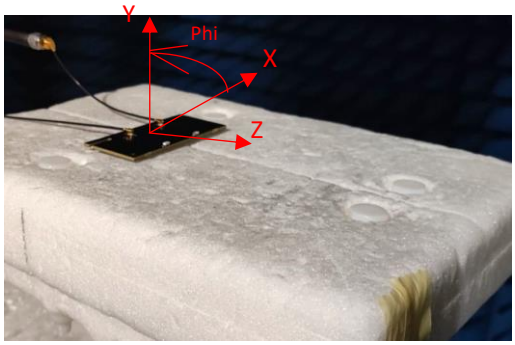
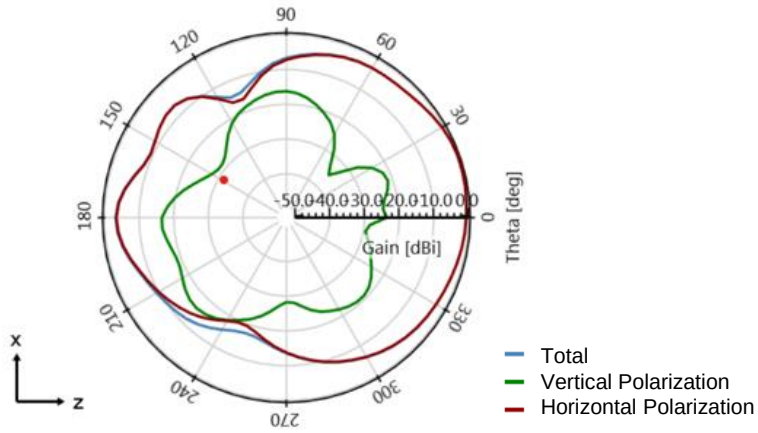
Low/ Hight Band Radiation Pattern

Typical performance M310220 performance in Free Space (2000-2180 MHz)

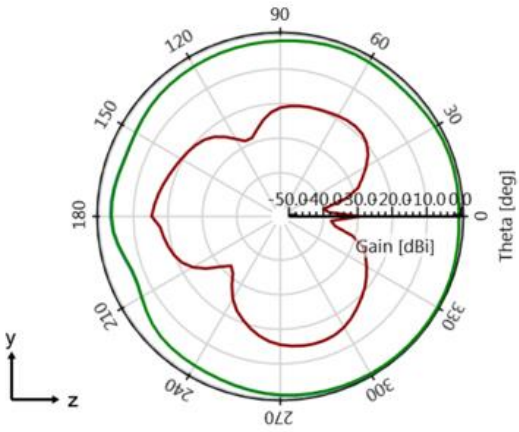
Position at phi = 0



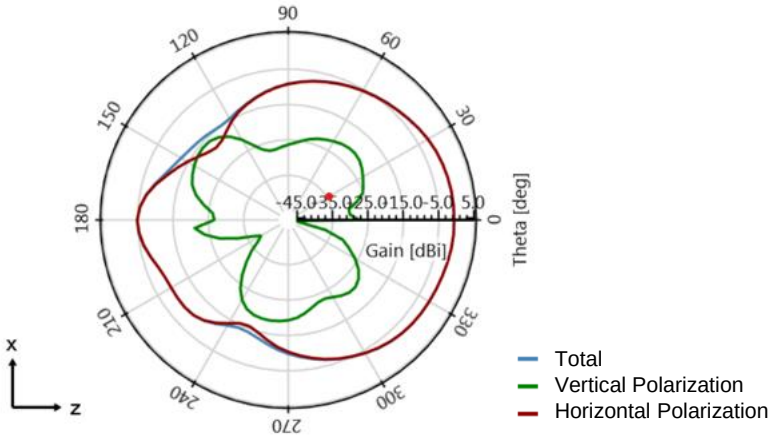
Phi = 0



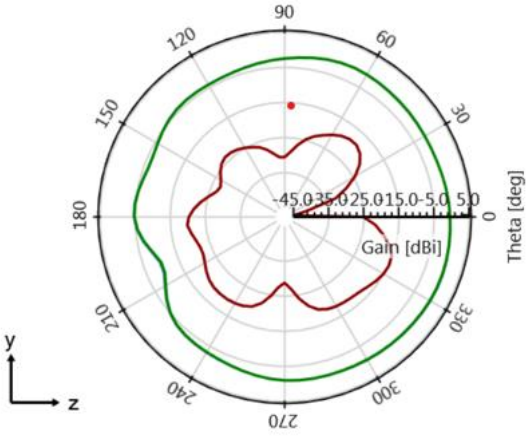
Phi = 90



Phi = 0



Phi = 90



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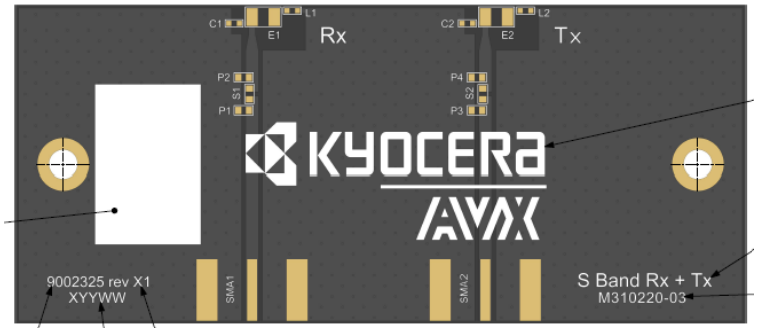
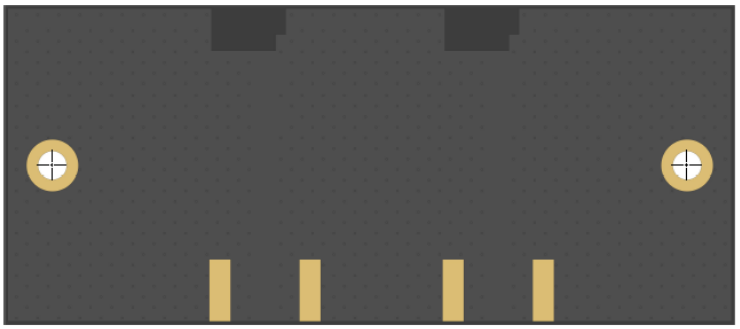
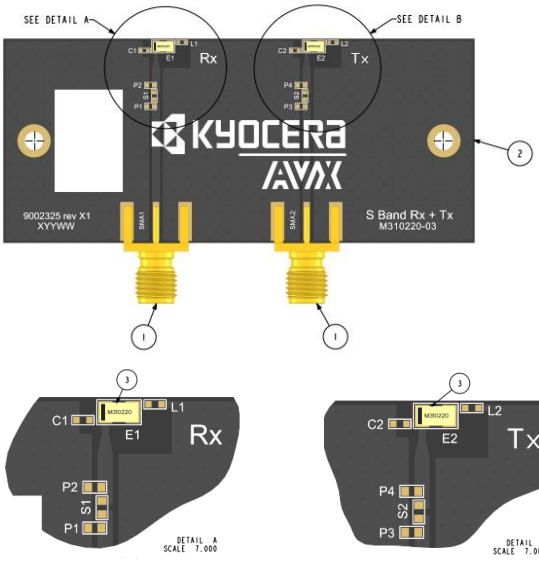
Mechanical Dimensions

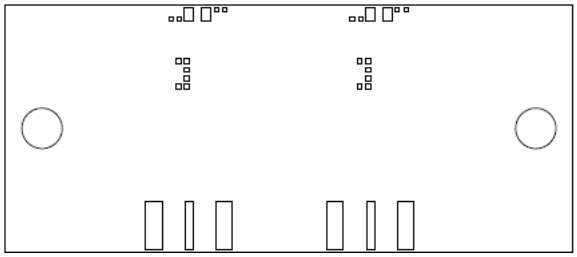
Typical antenna dimensions (mm)



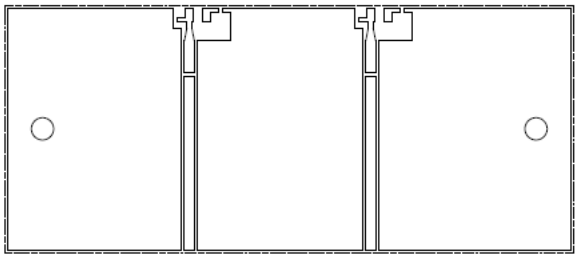




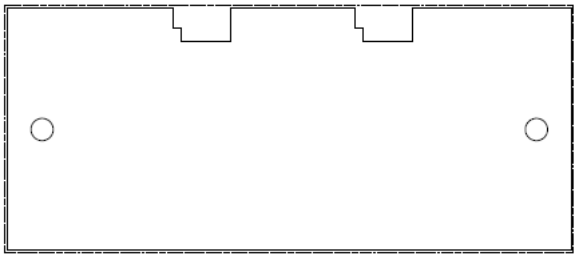
Top soldermask



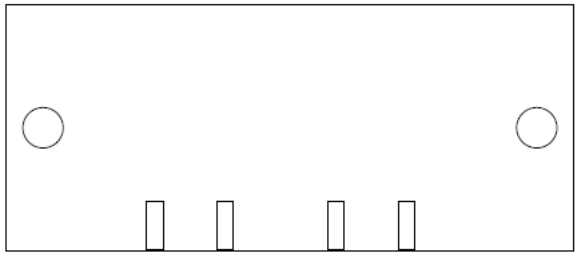
Top metal



Bottom metal



Bottom soldermask



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S-Band KYOCERA AVX's Embedded Antenna Specifications
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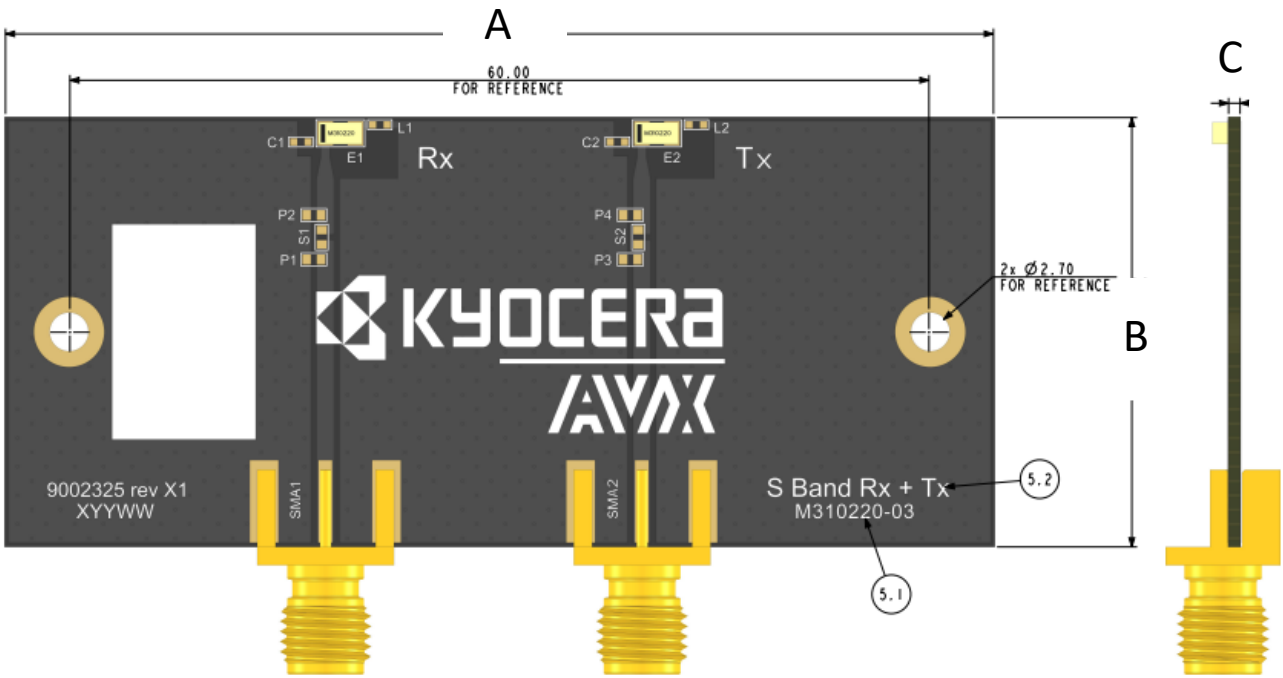
Antenna Demo Board Dimensions (M310220-03)

Typical Board dimensions (mm)

Part Number	A (mm)	B (mm)	C (mm)
M310220-03	69.00	30.00	0.80



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Additional Resources – M310220

Simulation Files:
HFSS (23 R1): https://www.kyocera-avx.com/download/antennas/ansys-hfss/23r1/1004795_05052023_23R1.zip
HFSS (19R3-22R2): https://www.kyocera-avx.com/download/antennas/ansys-hfss/19r3/M310220_08302022_19r3.zip
CST : https://www.kyocera-avx.com/download/antennas/CST/M310220_CST.zip

Application Note:
https://www.kyocera-avx.com/docs/techinfo/ApplicationNotes/Antenna-AppNotes/AVX-E_AppNote-M-Series.pdf

3D FIT File:
https://www.kyocera-avx.com/download/antennas/ME-FIT/M310220_ME-fit.zip

DXF File:
https://www.kyocera-avx.com/download/antennas/3D-DXF/M310220_3D-DXF.zip

Gerber File:
https://www.kyocera-avx.com/download/antennas/GERBER/M310220_GERBERS.zip

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