Part No. M830520

Wi-Fi Dual Band or Tri-Band Embedded Ceramic Antenna

2.4 / 5 / 6 GHz (802.11 a/b/g/n/c + Japan)

Supports: Wi-Fi applications, Wi-Fi 6E/7, Bluetooth, Zigbee, WLAN



Wi-Fi Dual Band or Tri-Band Embedded Ceramic Antenna

2.4 / 5 GHz or 2.4 / 5 / 6 GHz

KEY BENEFITS

Reduced Costs and Time-to-Market

Standard antenna eliminates design fees and cycle time associated with a custom solution; getting products to market faster.

Greater Flexibility with Unique Form Factors

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

Environmental Compliance

Comply with latest RoHS requirements

APPLICATIONS

- Embedded design
- Cellular, Headsets, Tablets
- Gateway, Access Point
- Handheld
- Telematics
- Tracking
- Healthcare (FDA Class I)
- IoT, Industrial devices
- Smart Grid

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. These innovative antennas provide compelling advantages for a full WIFI dual band enabled handheld devices, media players and other mobile 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. KYOCERA AVX antennas utilize patented IMD technology to deliver a unique size and performance combination.

Greater Flexibility

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

Electrical Specifications

Typical Characteristics on 40 x 80 mm PCB

Frequency (MHz)	2400 – 2485	5150 – 5825	5925 – 7125
Peak Gain	1.0 dBi	2.6 dBi	Refer to Appendix 1
Average Efficiency	62%	56%	
VSWR Match	2.1:1 max	2.8:1 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

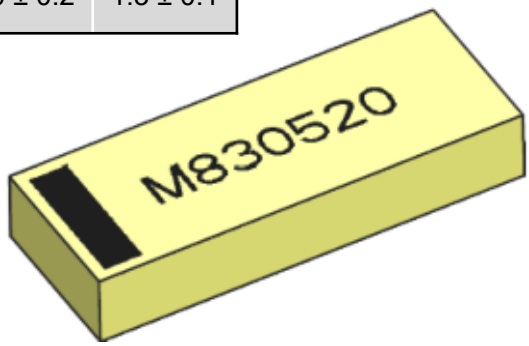
Ordering Part Number	M830520
Size (mm)	8.0 x 3.0 x 1.3
Mounting	SMT
Weight (grams)	0.2
Packaging	Tape & Reel, M830520 – 1,000 pieces per reel
Demo Board	M830520-01 (Wi-Fi Dual Band) M830520-02 (Wi-Fi Tri Band)
Additional Resources	Download DXF, Gerber and 3D FIT Files

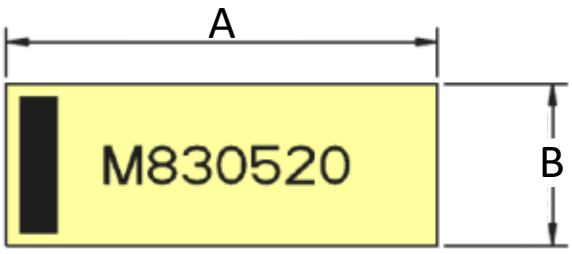
2.4 / 5 GHz KYOCERA AVX Embedded Antenna Specifications
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

Antenna Dimensions

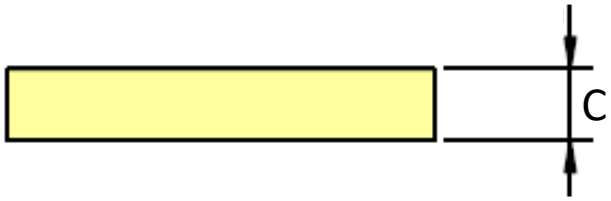
Typical antenna dimensions (mm)

Part Number	A (mm)	B (mm)	C (mm)
M830520	8.0 ± 0.2	3.0 ± 0.2	1.3 ± 0.1



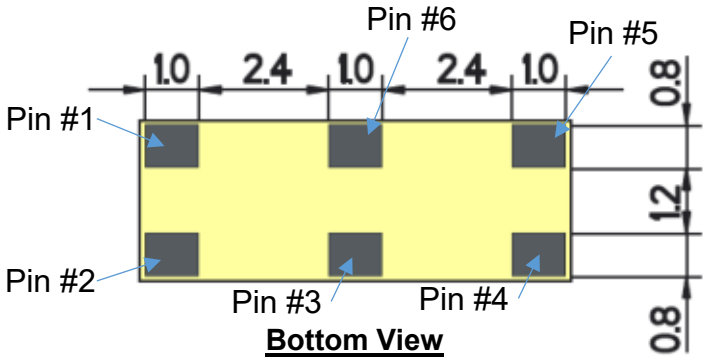


Top View



Height

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



Bottom View

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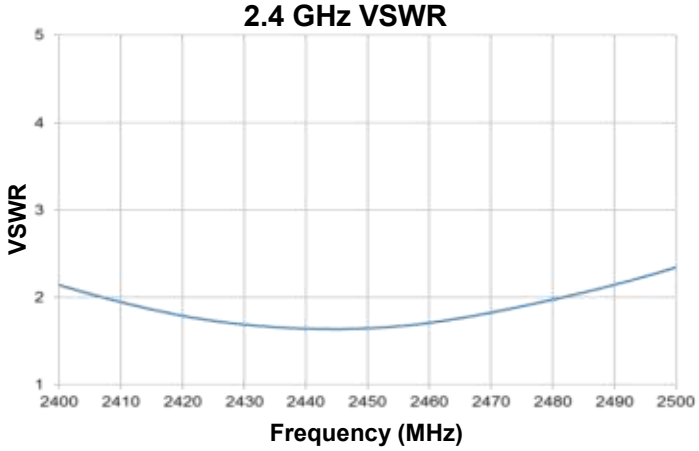
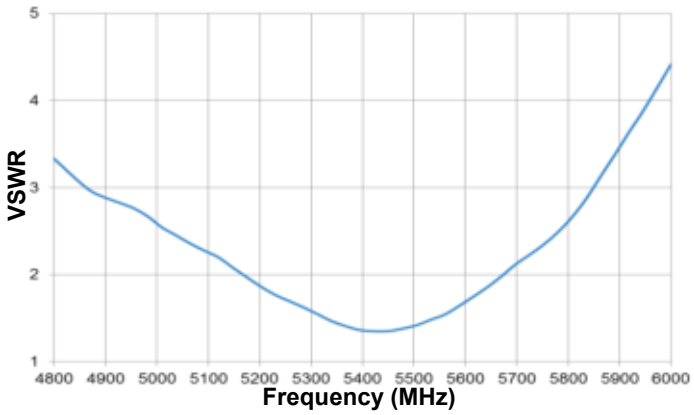
VSWR and Efficiency Plots (Off-Ground)

Typical performance on 40 x 80 mm PCB

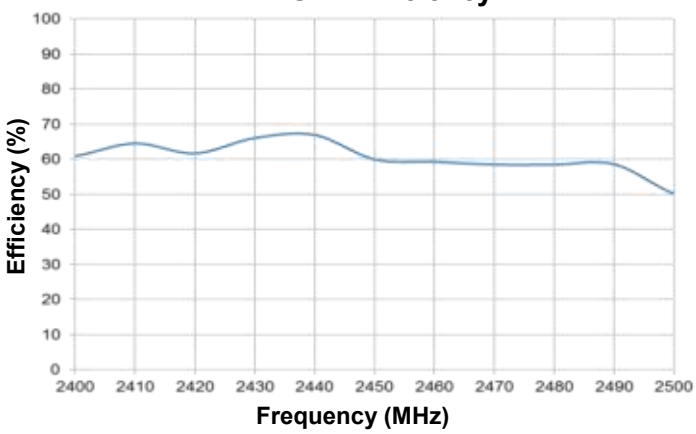
2.4 GHz VSWR



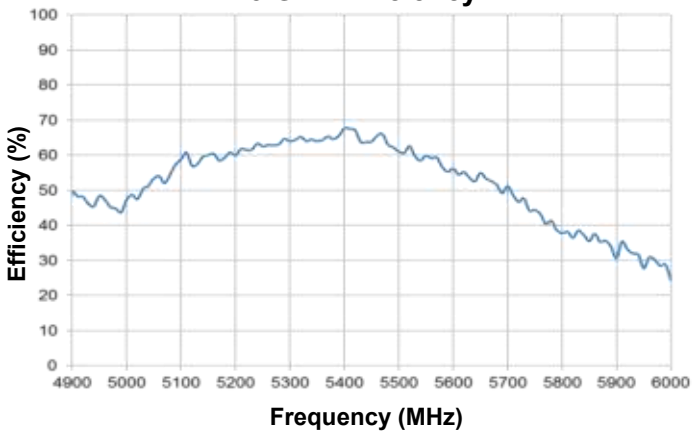
5 GHz VSWR



2.4 GHz Efficiency



5 GHz Efficiency



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2.4 / 5 GHz KYOCERA AVX Embedded Antenna Specifications
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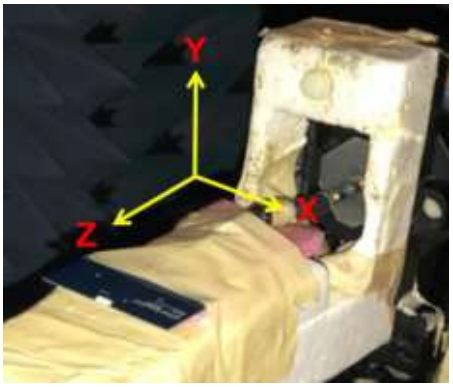
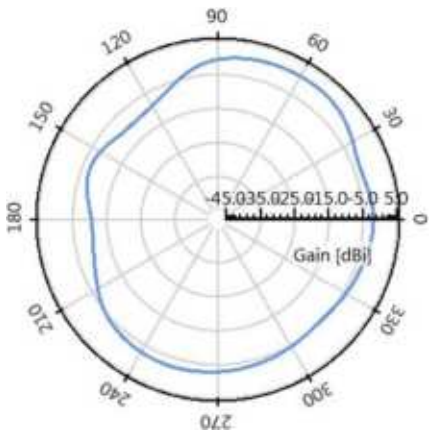
Antenna Radiation Patterns

Typical performance on 40 x 80 mm PCB

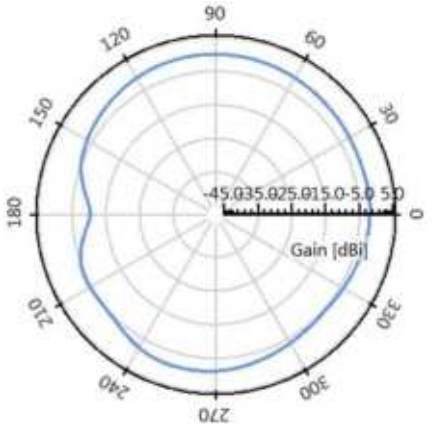


Measured at 2.400 GHz

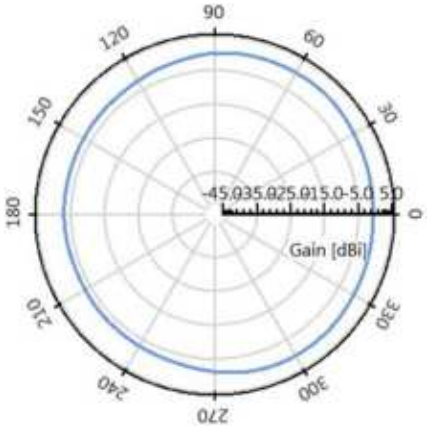
Phi = 0° Plane



Phi = 90° Plane

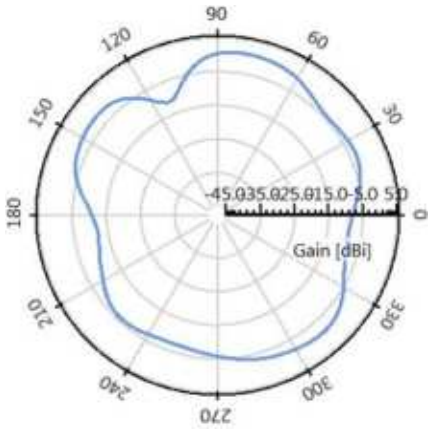


Theta = 90° Plane

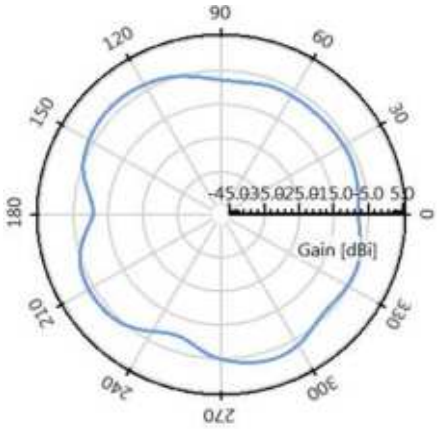


Measured at 5.100 GHz

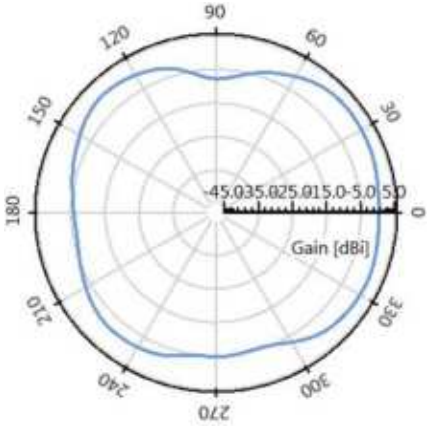
Phi = 0° Plane



Phi = 90° Plane



Theta = 90° Plane



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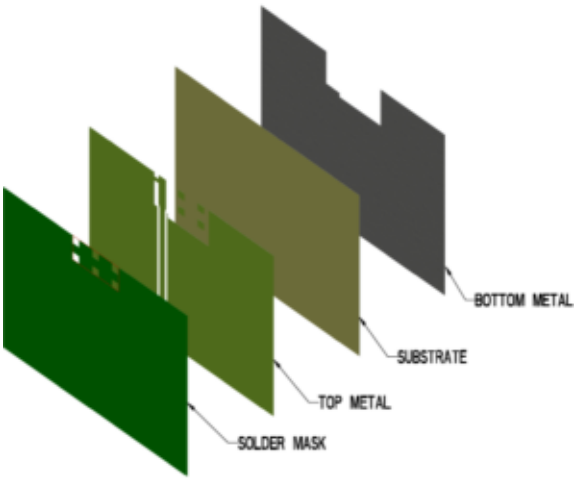
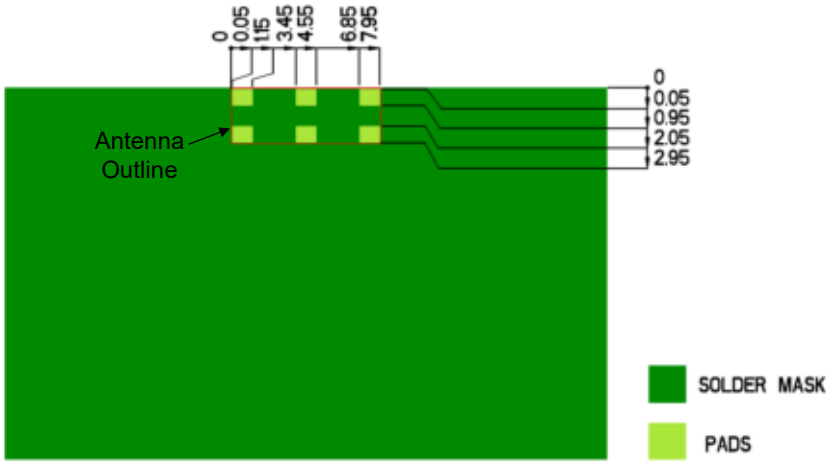
Antenna Layout (Off-Ground)

Typical layout dimensions (mm)

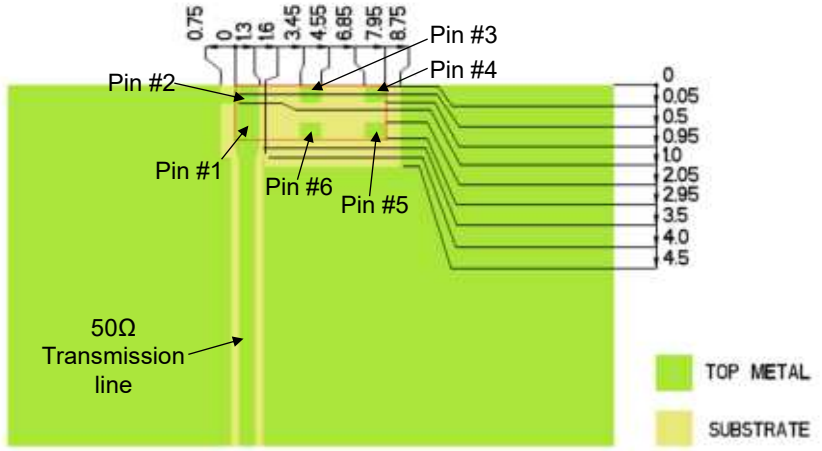


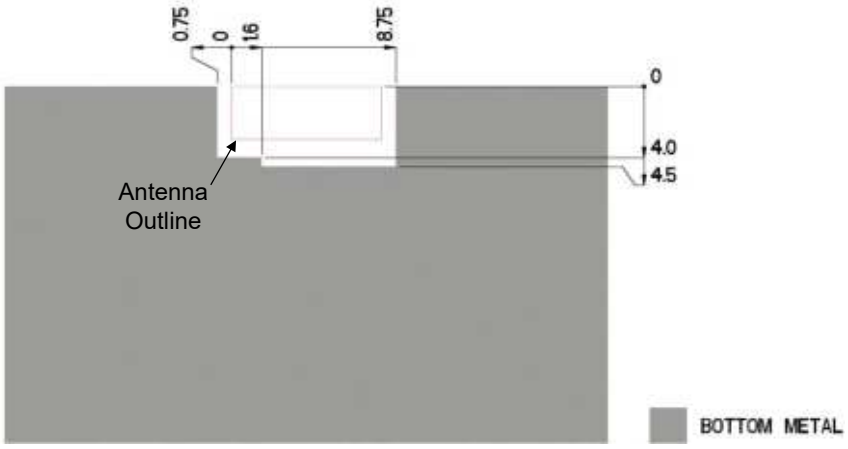


- Additional VIAS: Diam. 0.2mm to be placed around antenna, (no vias on transmission lines).
- Via holes must be covered by solder mask

Pin Descriptions

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





2.4 / 5 GHz KYOCERA AVX Embedded Antenna Specifications
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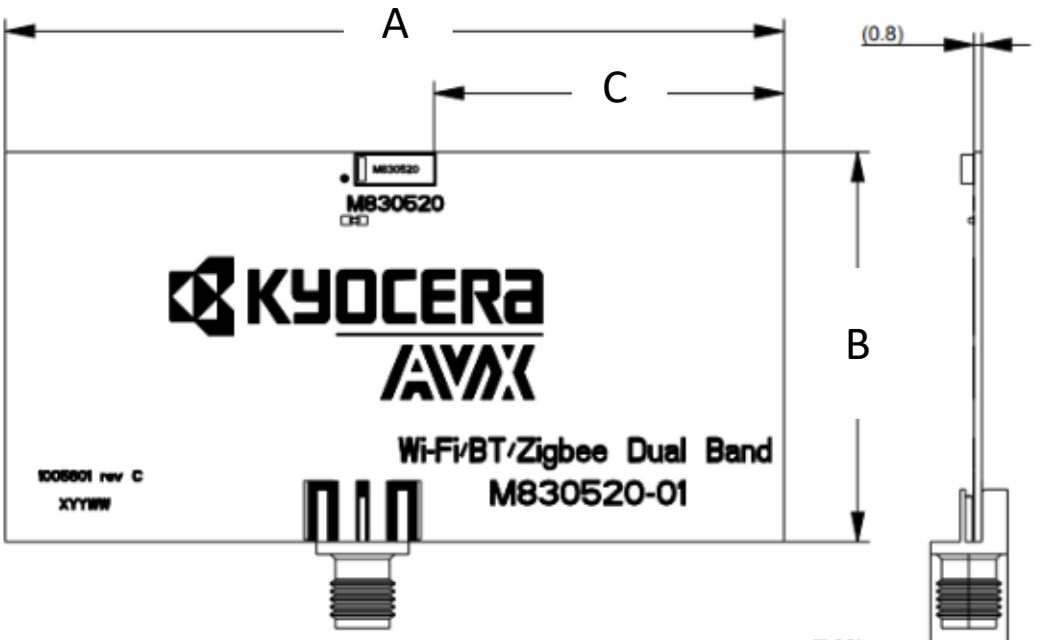
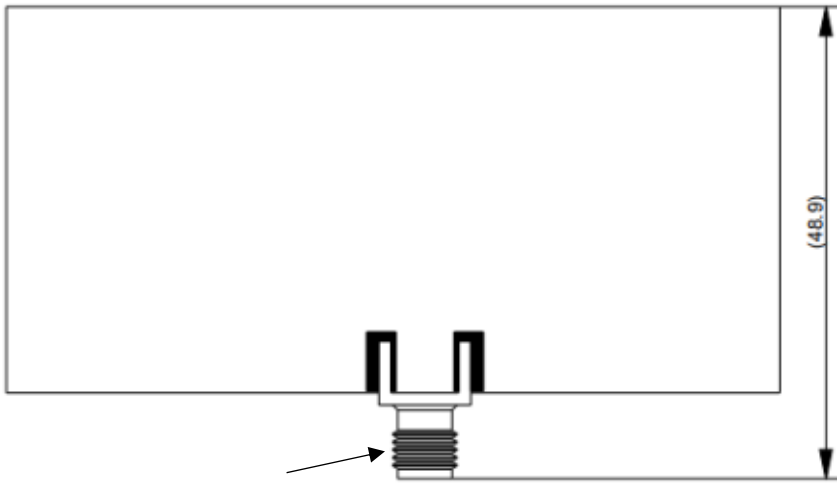
Antenna Demo Board

Typical layout dimensions (mm)

Part Number	A (mm)	B (mm)	C (mm)
M830520-01	80.0	40.0	36.0



Front View **Side View**



Back View

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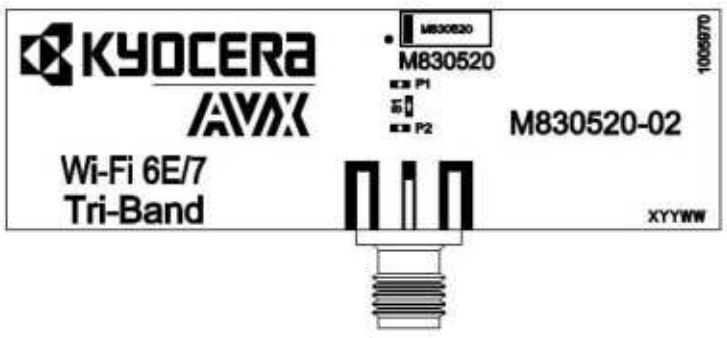
Appendix 1

Appendix 1 gives instructions on how to achieve Tri-Band Wi-Fi 6E/7 to cover till 7.125 GHz through layout modifications.

(2.4-2.48 GHz)
(5.150-5.825GHz)
(5.925-7.125 GHz)

Frequency (MHz)	2400 - 2485	5150 - 5825	5925-7125
Peak Gain	2.6 dBi	2.5 dBi	4.0 dBi
Average Efficiency	58%	61%	63%
VSWR Match	< 3:1	< 3:1	< 3:1
Polarization	Linear		
Power Handling	0.5 Watt CW		
Feed Point Impedance	50 Ω unbalanced		

**Data shown above over 20 x 65 mm PCB.*



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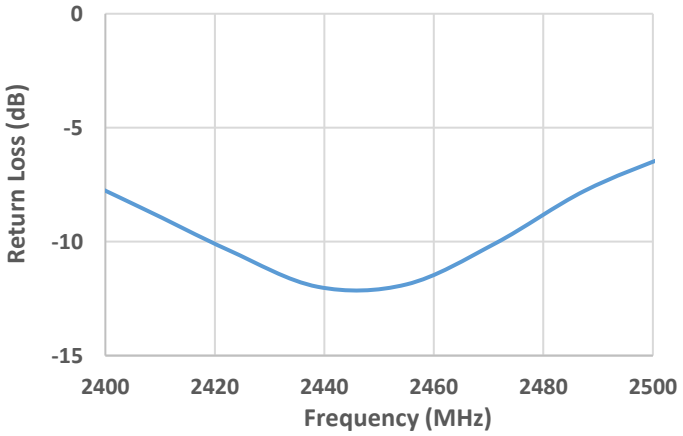
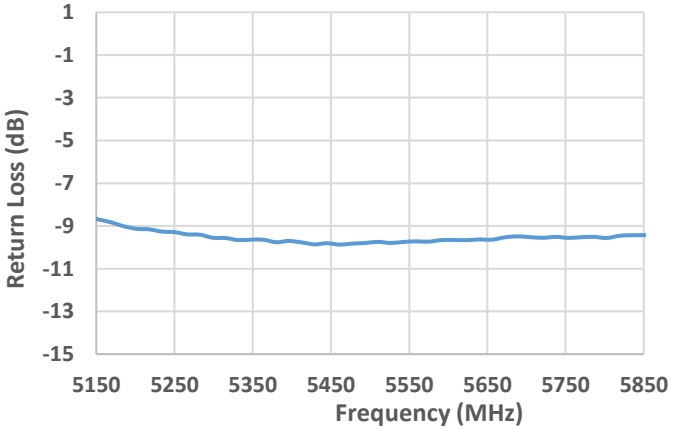
Return Loss, Efficiency and Peak Gain Plots

Typical performance on 20 x 65 mm PCB

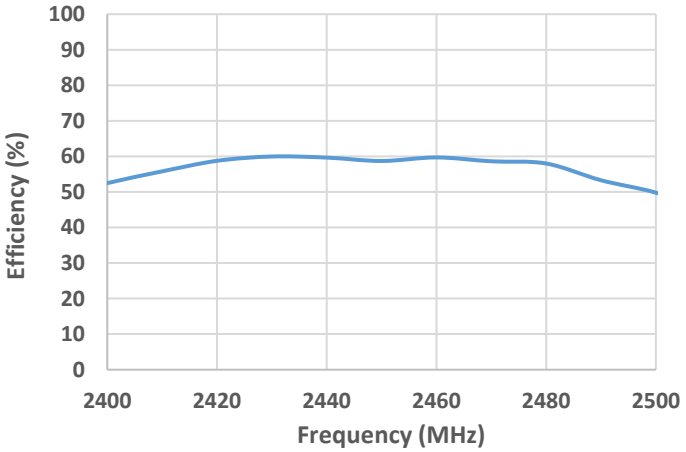
Return Loss (2400 – 2500 MHz)



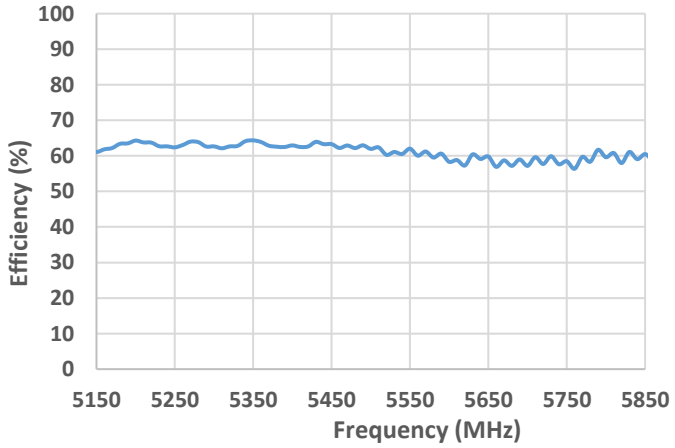
Return Loss (5150 – 5850 MHz)



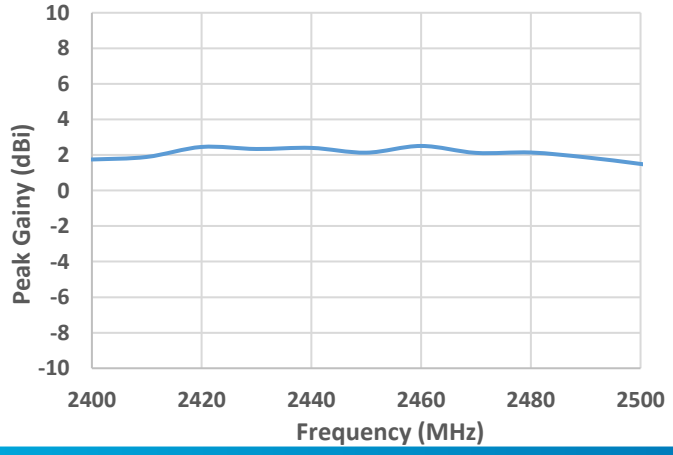
Efficiency (2400 – 2500 MHz)



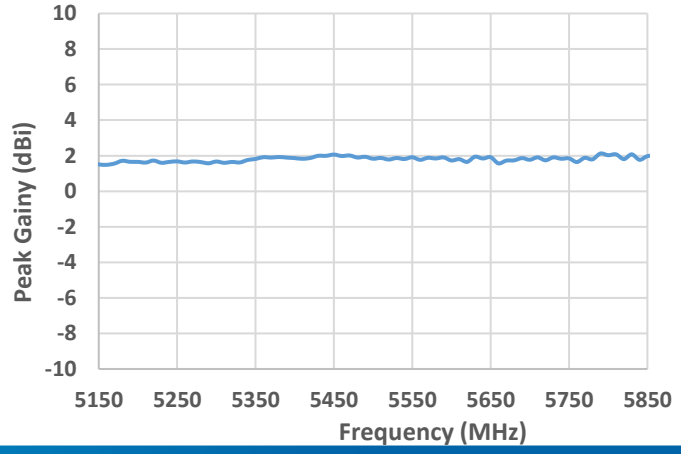
Efficiency (5150 – 5850 MHz)



Peak Gain (2400 – 2500 MHz)



Peak Gain (5150 – 5850 MHz)



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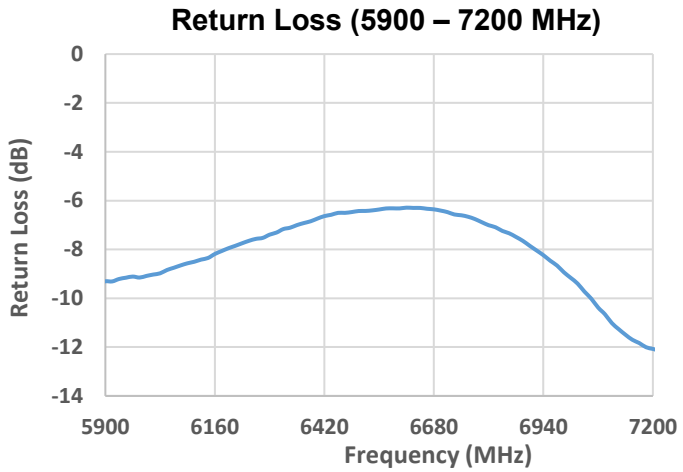
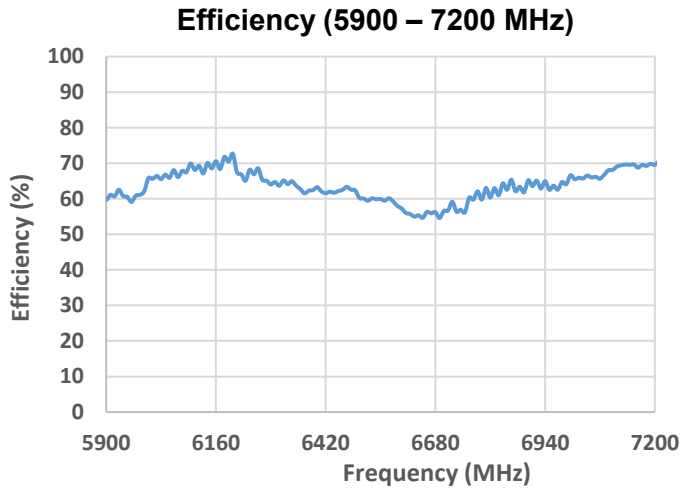
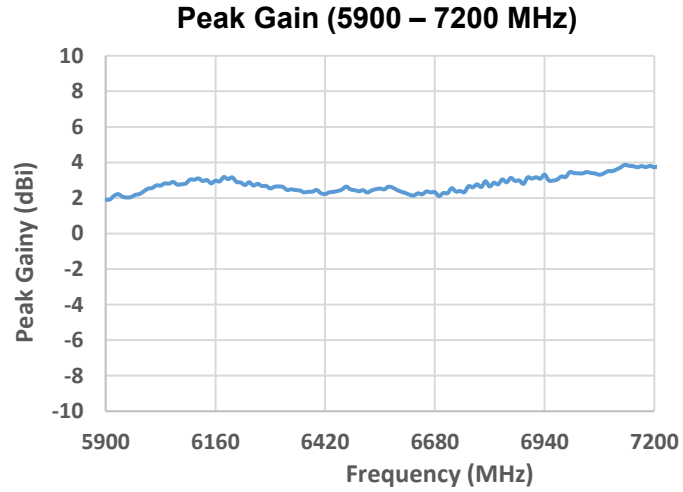
Return Loss, Efficiency and Peak Gain Plots

Typical performance on 20 x 65 mm PCB







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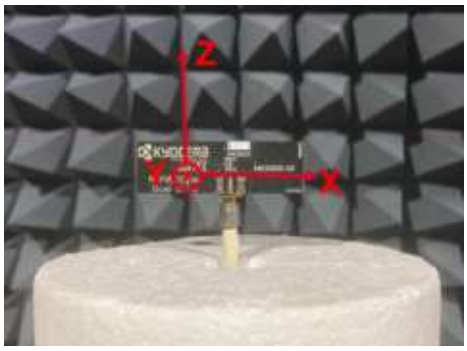
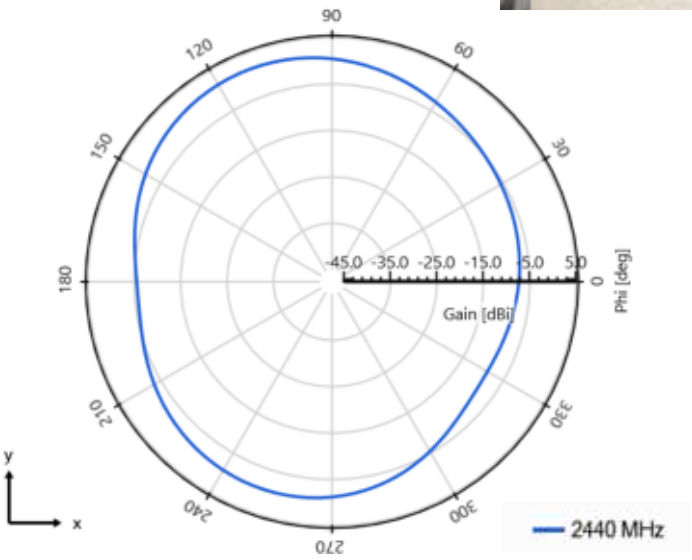
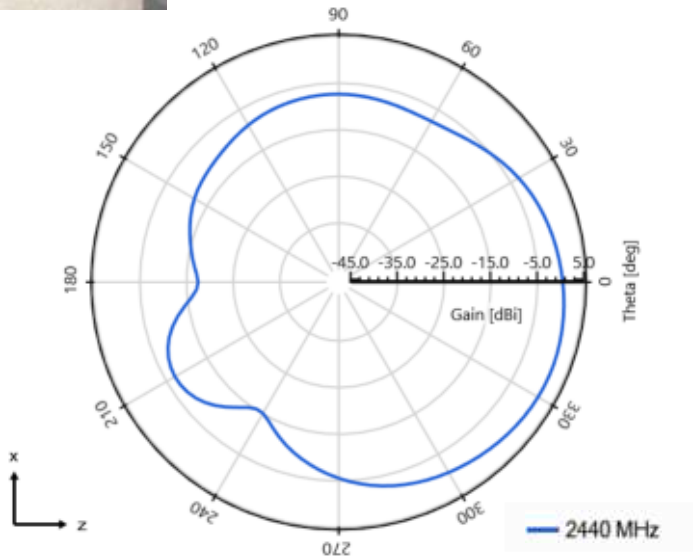
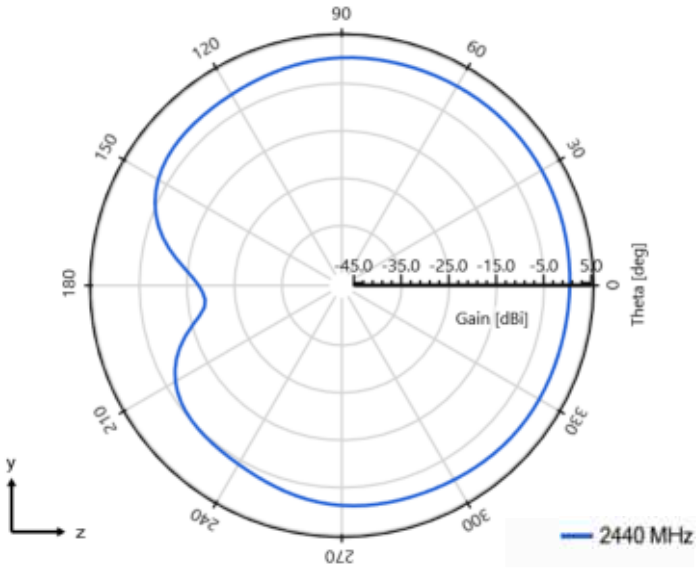
Antenna Radiation Patterns

Typical performance on 20 x 65 mm PCB
Measured at 2440 MHz









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2.4 / 5 / 6 GHz KYOCERA AVX Embedded Antenna Specifications
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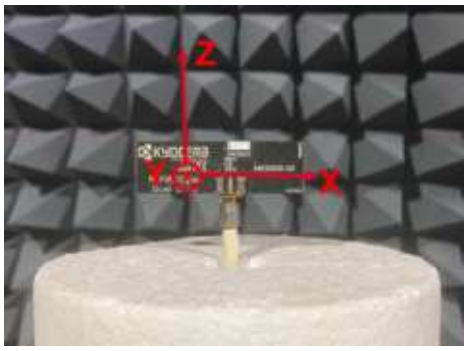
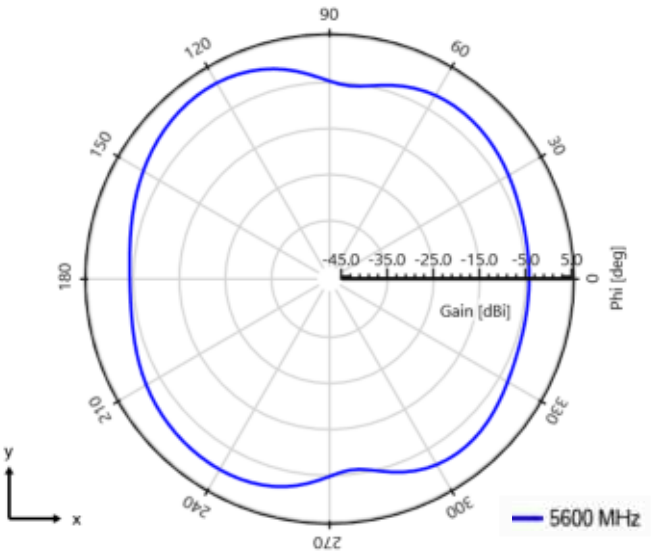
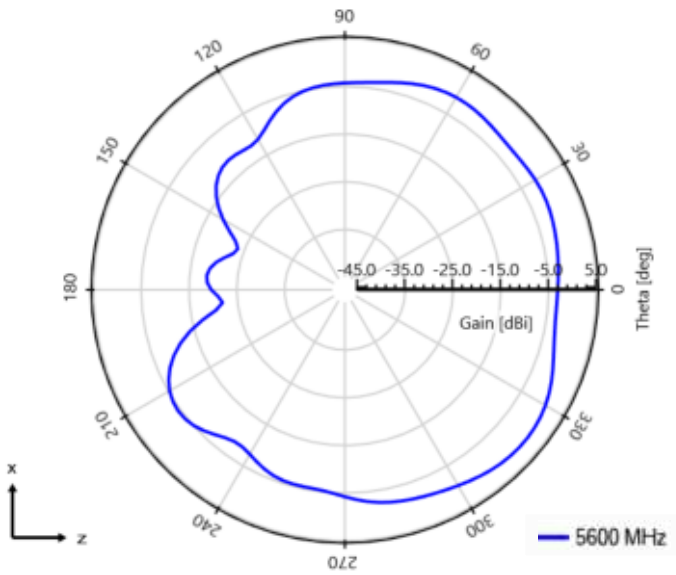
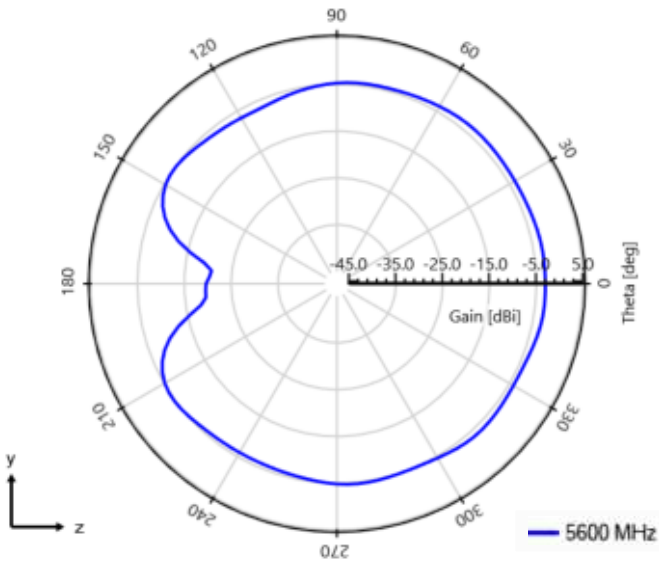
Antenna Radiation Patterns

Typical performance on 20 x 65 mm PCB
Measured at 5600 MHz









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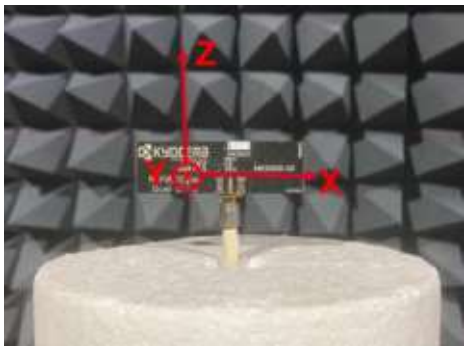
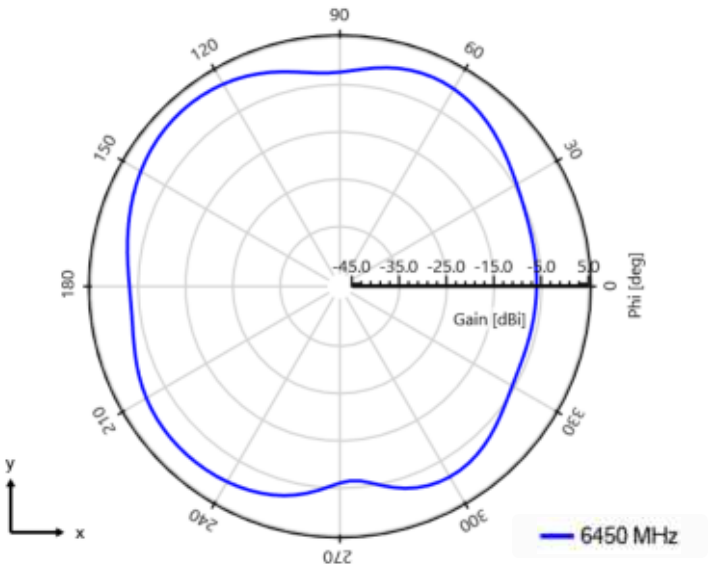
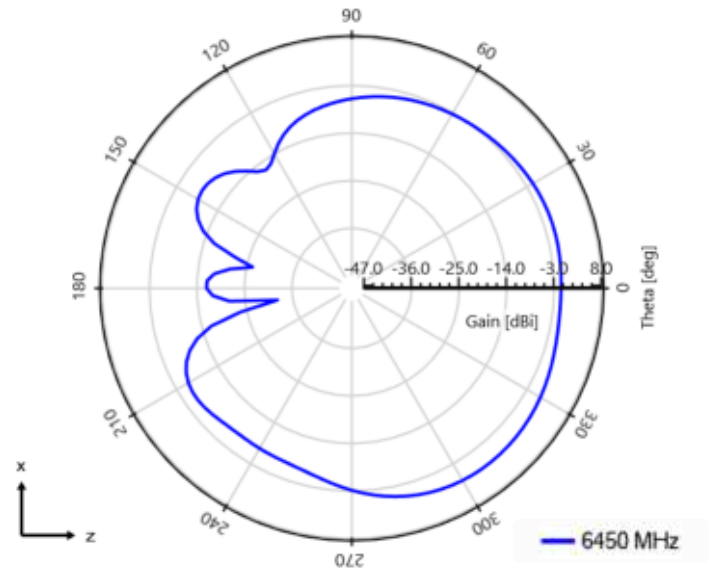
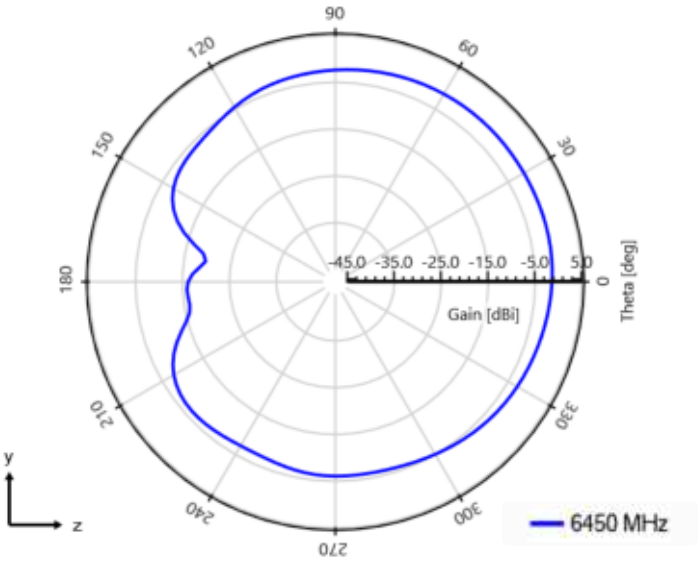
Antenna Radiation Patterns

Typical performance on 20 x 65 mm PCB
Measured at 6450 MHz









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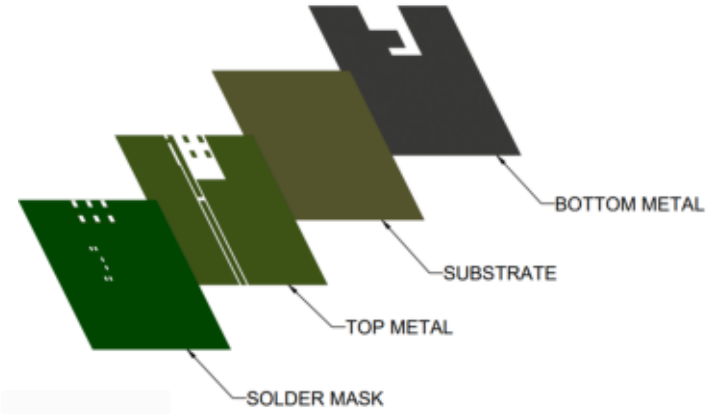
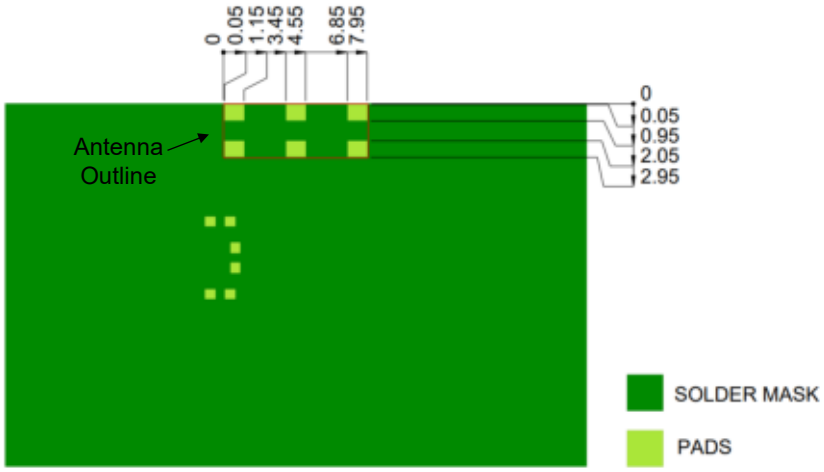
2.4 / 5 / 6 GHz KYOCERA AVX Embedded Antenna Specifications
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

Antenna Layout (M830520-02)

Typical layout dimensions (mm)

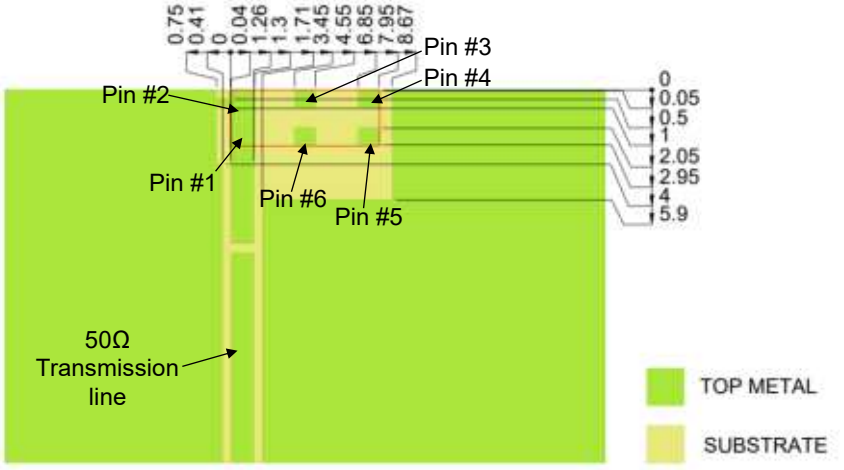


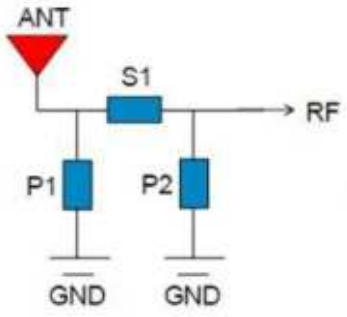


- Additional VIAS: Diam. 0.2mm to be placed around antenna, (no vias on transmission lines).
- Via holes must be covered by solder mask

Pin Descriptions

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

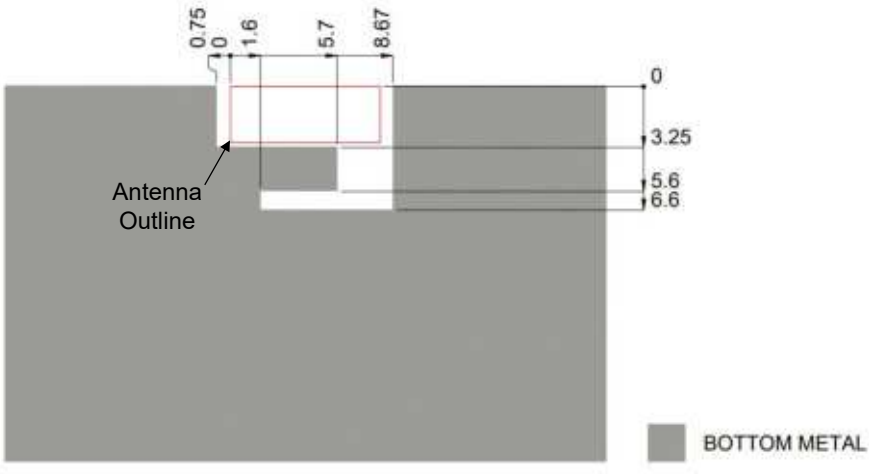




Matching Pi Network (Demo Board)

Component	Value
P1	N/A
S1	0 ohm
P2	N/A

*Actual matching values depend on customer design



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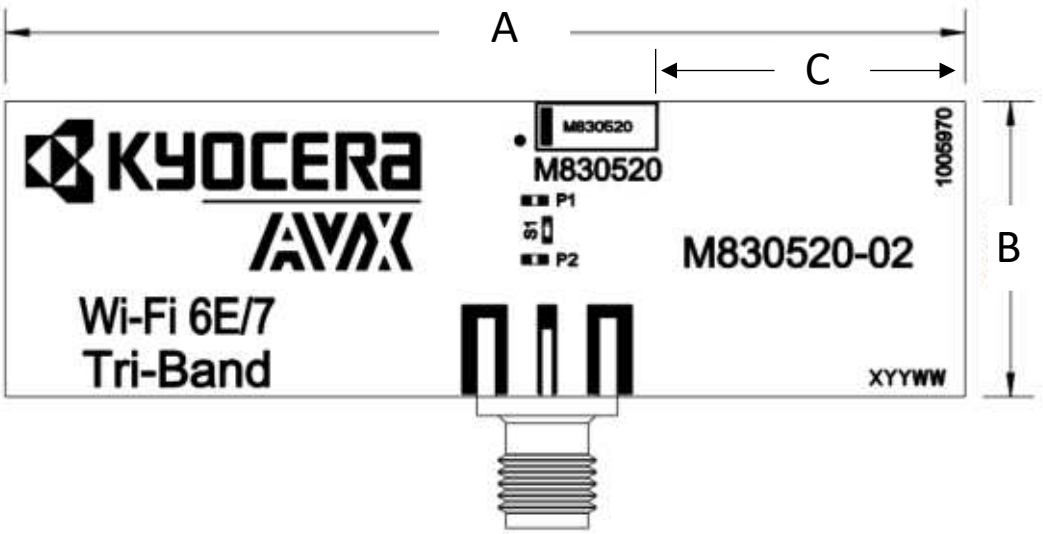
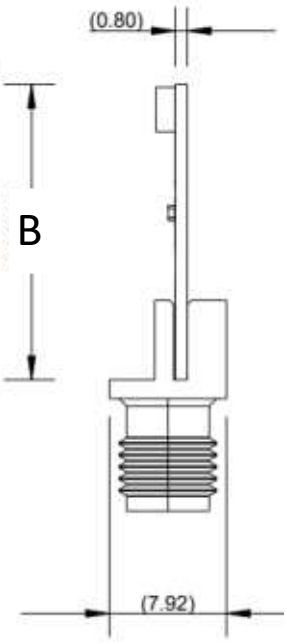
Antenna Demo Board

Typical layout dimensions (mm)

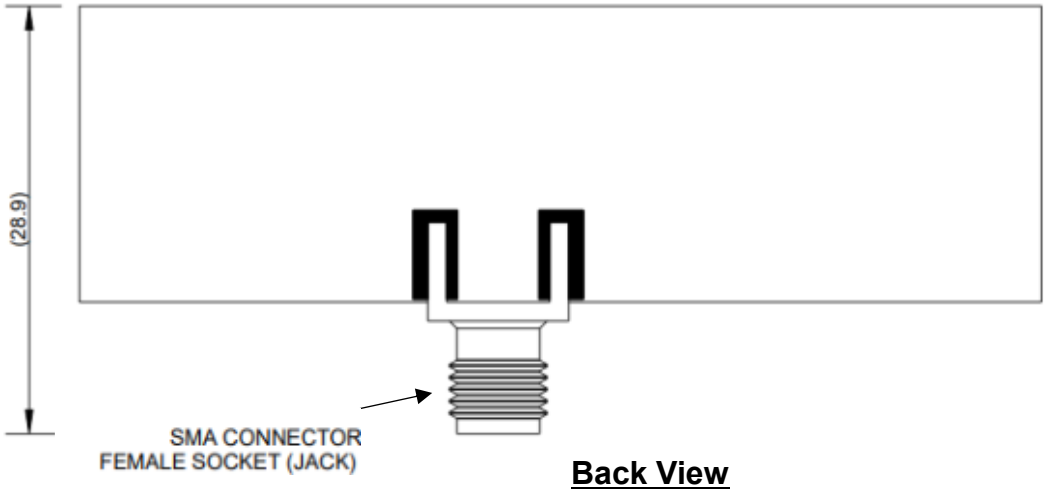
Part Number	A (mm)	B (mm)	C (mm)
M830520-02	65.0	20.0	20.9



Front View



Side View



Back View

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Additional Resources – M830520

Simulation Files:
HFSS (23 R1): https://www.kyocera-avx.com/download/antennas/ansys-hfss/23r1/M830520_08232022_23r1.zip
HFSS (19R3-22R2): https://www.kyocera-avx.com/download/antennas/ansys-hfss/19r3/M830520_08232022_19r3.zip
CST : https://www.kyocera-avx.com/download/antennas/CST/M830520_CST_071024_23r1.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/M830520_ME_fit.zip

DXF File:
https://www.kyocera-avx.com/download/antennas/3D-DXF/M830520_3D-DXF.zip

Gerber File:
https://www.kyocera-avx.com/download/antennas/GERBER/M830520_GERBERS.zip

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