

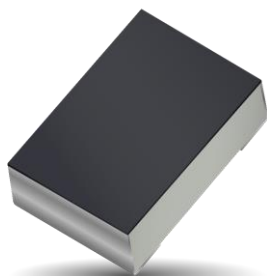


Part No. 9001978

Wi-Fi Dual Band or BT Ceramic Antenna or UWB Antenna

2.4 GHz, 5.0 GHz, 6.0 GHz - 8.5 GHz

Supports: Wi-Fi applications, Agriculture, Bluetooth, Zigbee, WLAN, Smart Home, Healthcare, Digital Signage, UWB



KYOCERA AVX ceramic antenna designed for Wi-Fi, BT, or UWB applications exhibits the high efficiency in a small footprint and delivers the key needs to the device engineers for the higher functionality and better performance in a smaller and thinner designs. For further optimization to custom design and for support to integrate and test this antenna performance in your device, contact our Customer Support Team.

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.

Layout:

9001978-03: Wi-Fi Dual Band

9001978-01: BT

9001978-04:UWB

KEY BENEFITS

Greater Flexibility with Unique Form Factors

KYOCERA AVX 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

Comply with latest RoHS requirements

APPLICATIONS

- Embedded design
- Cellular, Headsets, Tablets
- Gateway, Access Point
- Handheld
- Telematics
- Tracking
- Healthcare
- M2M, Industrial devices
- Smart Grid
- OBD-II
- UWB

Electrical Specifications

Typical performance on 55 x 25 mm PCB

Frequency (MHz)	2400 – 2485	5150 – 5850	2400 – 2485 (BT ONLY)	6000 – 8500 (UWB ONLY)
Peak Gain	3.0 dBi	3.0 dBi	Refer to Appendix 1	Refer to Appendix 2
Average Efficiency	65%	50%		
VSWR	2.1:1 max	7:1 max		
Feed Point Impedance	50 ohms unbalanced			
Polarization	Linear			
Power Handling	0.5 Watt CW			

Mechanical Specifications & Ordering Part Number

Ordering Part Number	9001978
Size (mm)	1.00 x 0.55 x 0.40
Mounting	Surface mounted to the PCB
Weight (grams)	0.003
Packaging	Tape & Reel 9001978 – 5,000 pieces per reel
Demo Board	9001978-03 (Wi-Fi Dual Band) 9001978-01 (BT) Appendix 1 9001978-04 (UWB) Appendix 2
Operational Temperature Range	-55 °C to +125 °C
Storage Temperature / Humidity Condition	15 °C to +35 °C / ≤ 65%

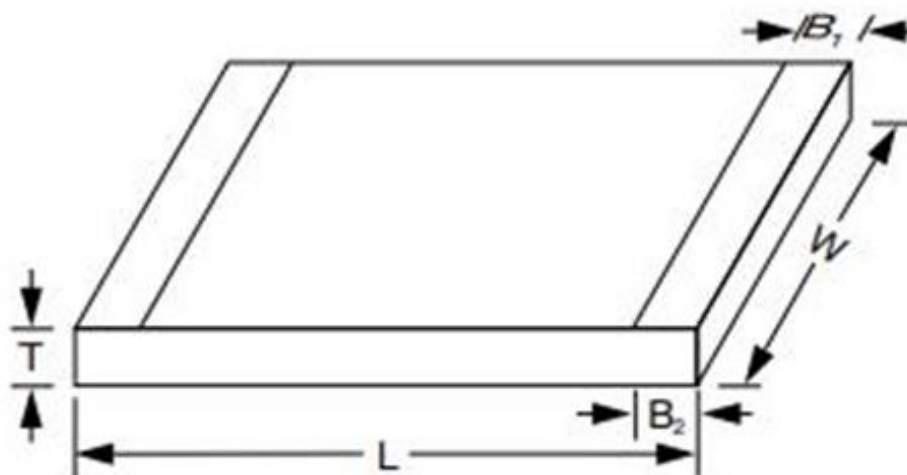
Wi-Fi Dual Band or BT KYOCERA AVX Embedded Ceramic Antenna Specification
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

Antenna Dimensions

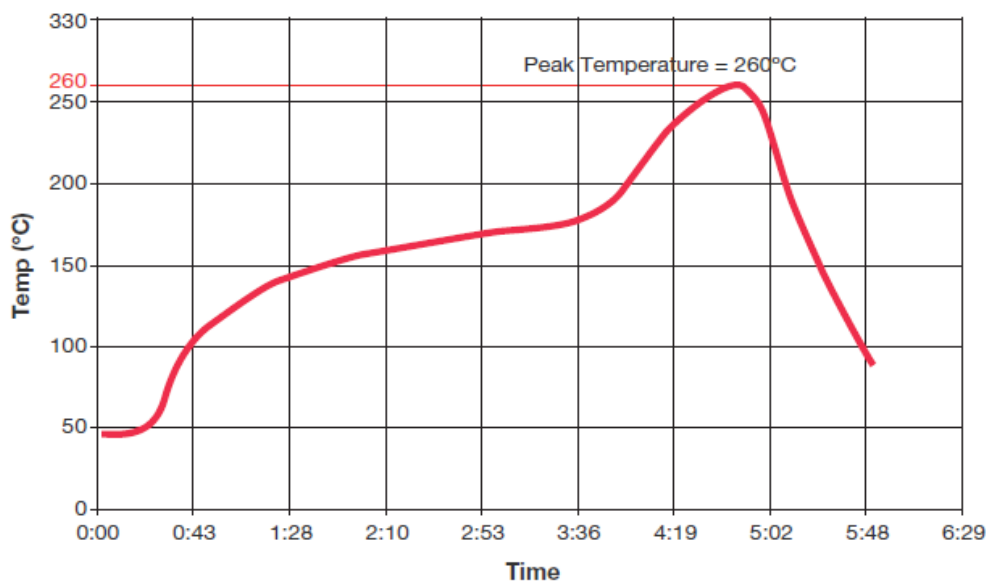
Typical antenna dimensions (mm)

Part Number	L	W	T	B ₁	B ₂
9001978	1.00±0.1	0.55±0.07	0.40±0.1	0.00+0.1	0.20±0.1

*Antenna can be mounted both ways.



Lead Free Solder SMT Reflow Temperature Profile

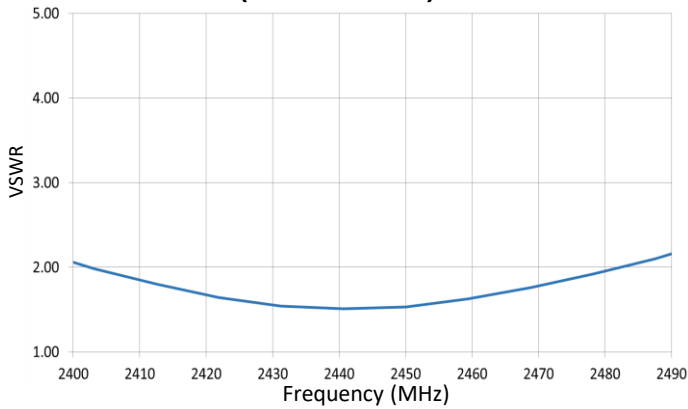


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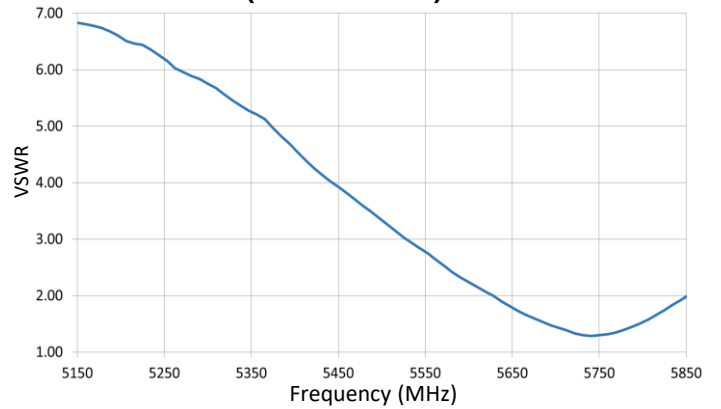
VSWR, Efficiency, and Peak Gain Plots

Typical Performance on 55 x 25 mm PCB

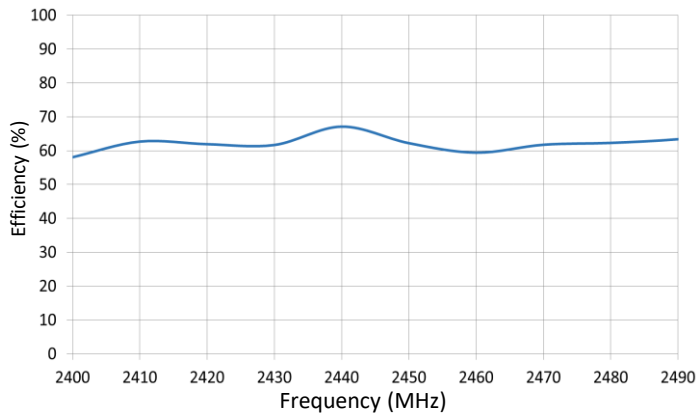
**VSWR
(2.400 – 2.490) GHz**



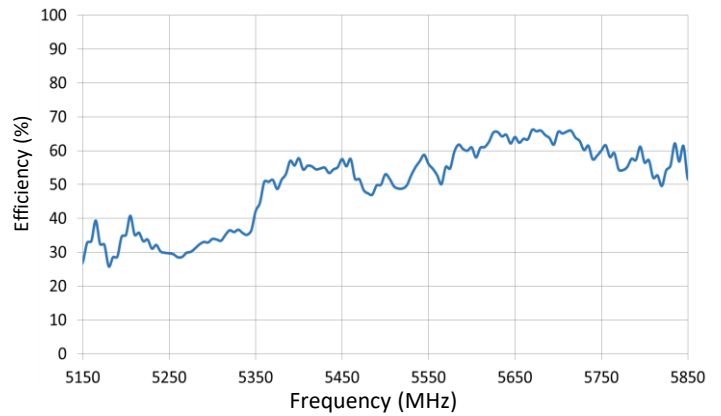
**VSWR
(5.150 – 5.850) GHz**



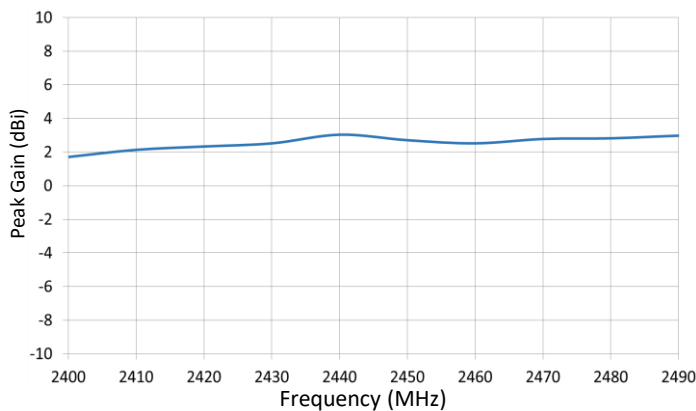
**Efficiency
(2.400 – 2.490) GHz**



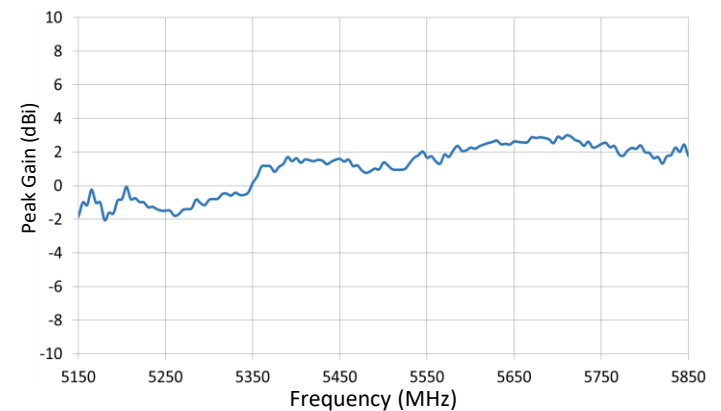
**Efficiency
(5.150 – 5.850) GHz**



**Peak Gain
(2.400 – 2.490) GHz**



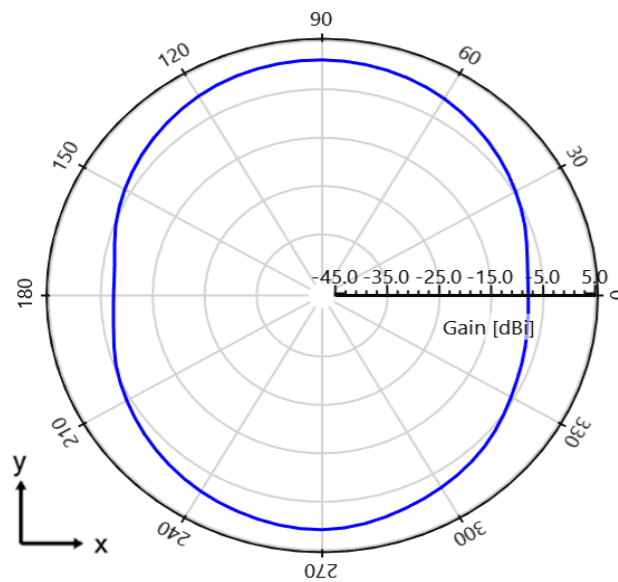
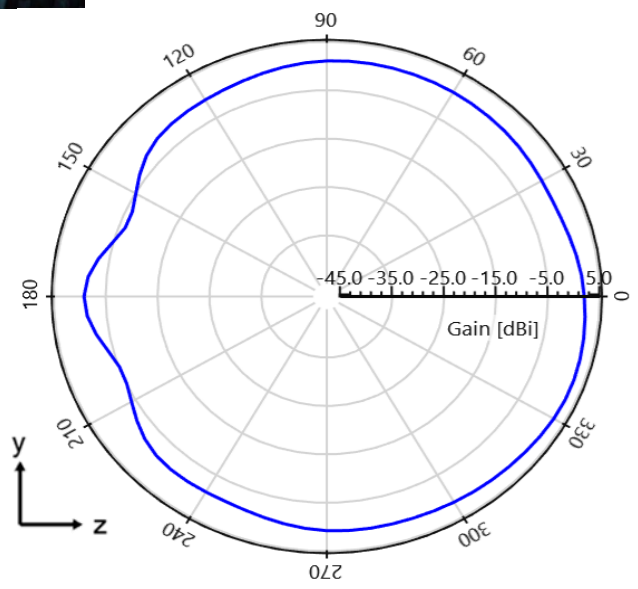
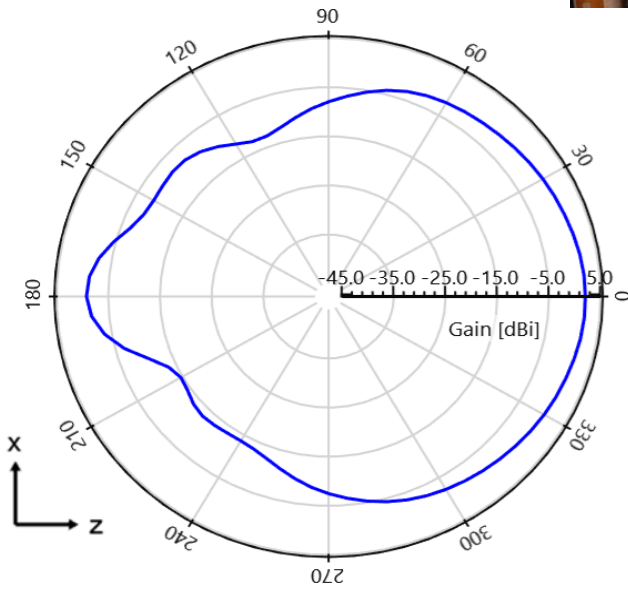
**Peak Gain
(5.150 – 5.850) GHz**



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Antenna Radiation Patterns

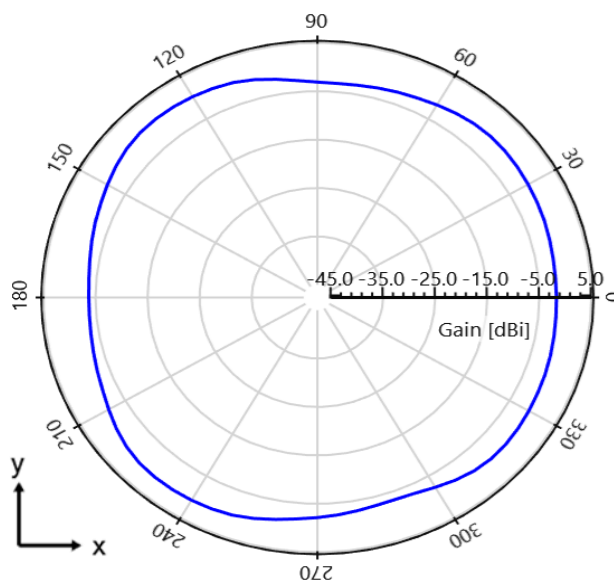
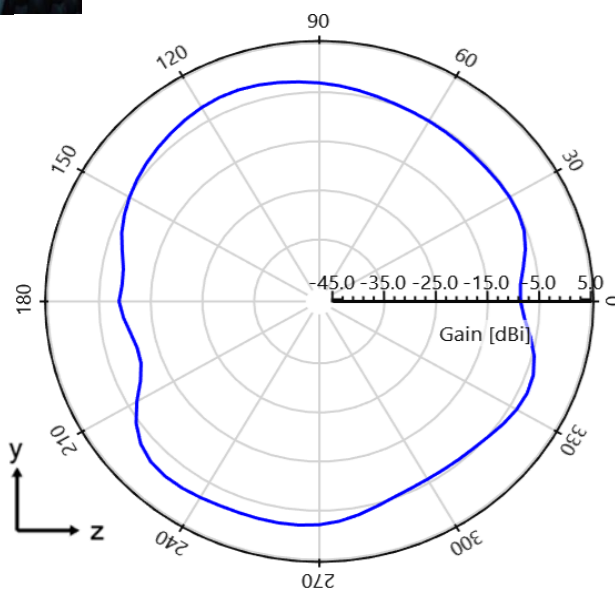
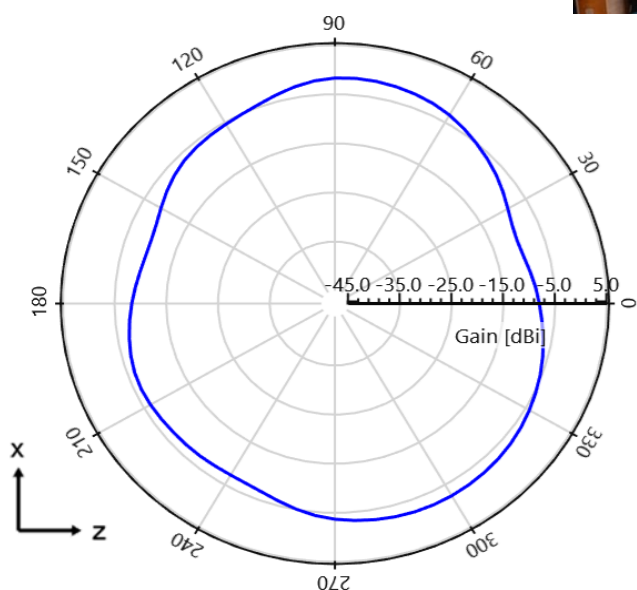
Typical Performance on 55 x 25 mm PCB
 Measured @ 2.440 GHz



Wi-Fi Dual Band or BT KYOCERA AVX Embedded Ceramic Antenna Specification
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Antenna Radiation Patterns

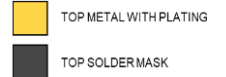
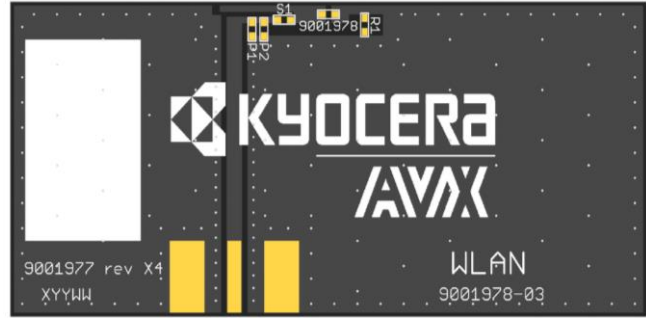
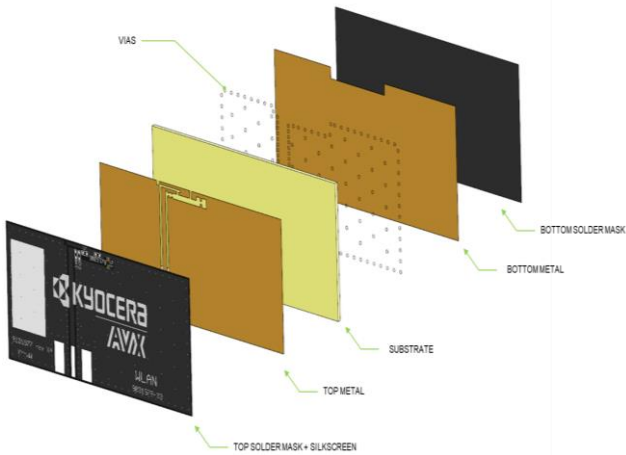
Typical Performance on 55 x 25 mm PCB
 Measured @ 5.550 GHz



Wi-Fi Dual Band or BT KYOCERA AVX Embedded Ceramic Antenna Specification
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Antenna Layout (9001978-03)

Typical layout dimensions (mm)



* VIAS: Diam. 0.2mm, (no vias on transmission lines).
 Via holes must be covered by solder mask

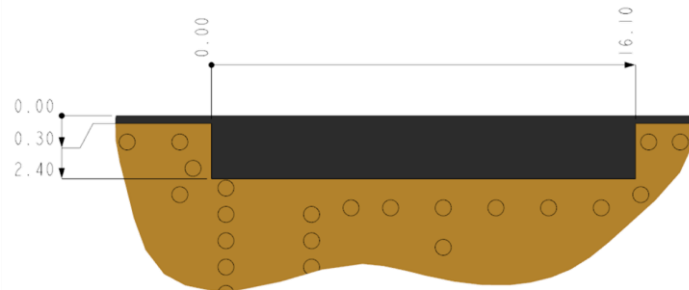
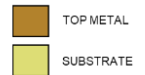
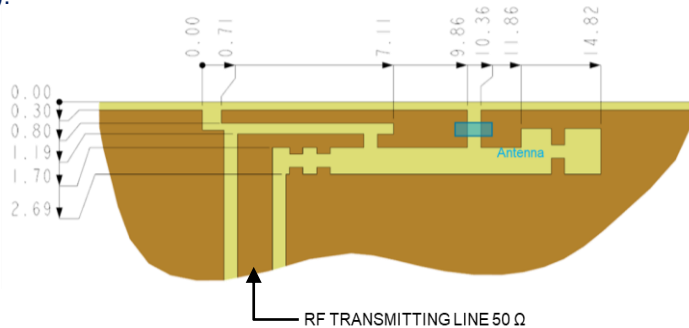
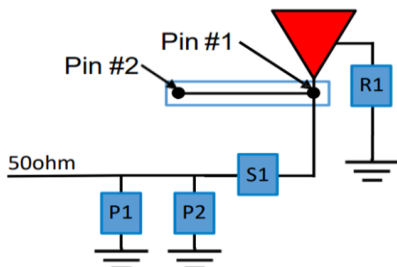
Pin Description

Pin#	Description
1	Feed
2	Ground

Matching Pi Network (Demo Board)

Component	Value	Tolerance
P1	1.8nH	±0.05nH
S1	2.4pF	±0.1pF
P2	N/A	N/A
R1	N/A	N/A

*Actual matching values depend on customer design



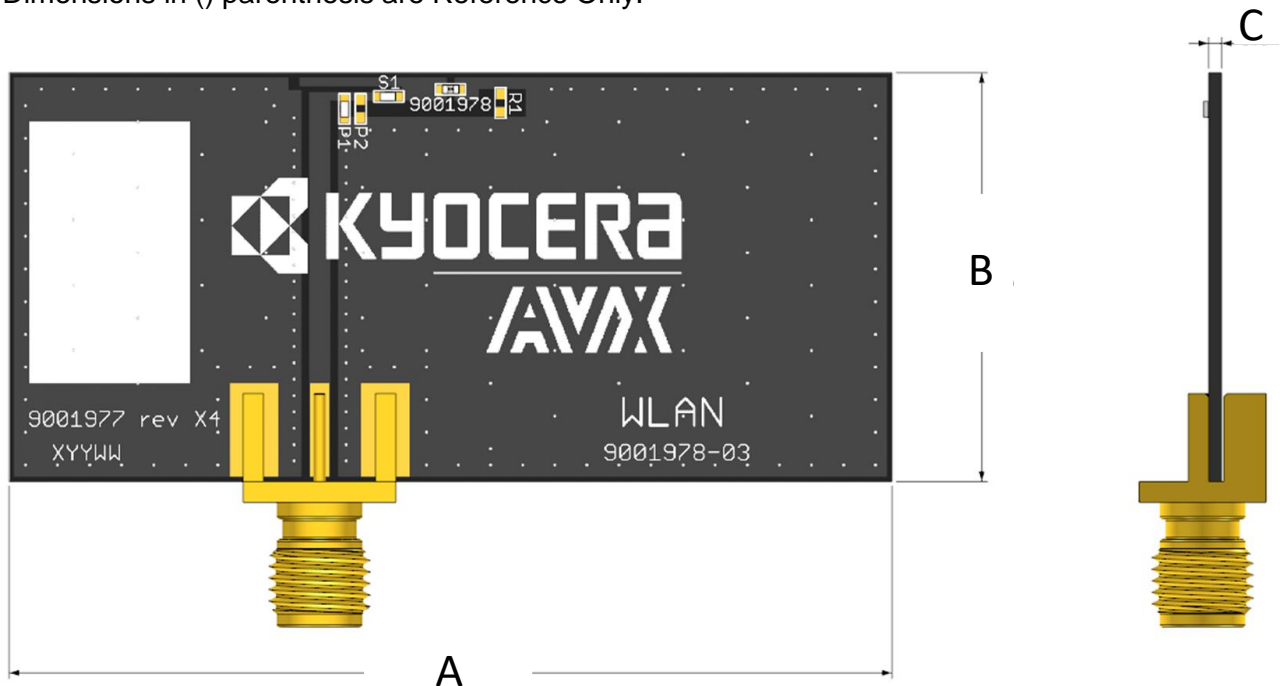
Wi-Fi Dual Band or BT KYOCERA AVX Embedded Ceramic Antenna Specification
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Antenna Demo Board (9001978-03)

Typical layout dimensions (mm)

Part Number	A	B	C
9001978-03	(55.0)	(25.0)	(0.80)

*Dimensions in () parenthesis are Reference Only.



Appendix 1 BT KYOCERA AVX Embedded Ceramic Antenna Specifications
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

Appendix 1

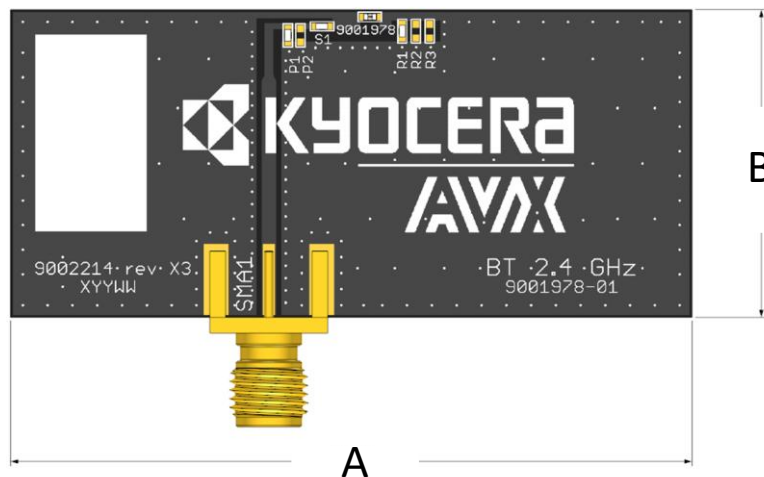
Appendix 1 gives instructions on how to match antenna through impedance matching network for BT (2400-2485 MHz) only.

Frequency (MHz)	2400-2485
Peak Gain (dBi)	3.45
Efficiency (%)	68
VSWR	<2.5:1
Feed Point Impedance	50 Ω unbalanced

*Data shown above has Appendix 1 matching applied on 55 x 25 mm pcb.

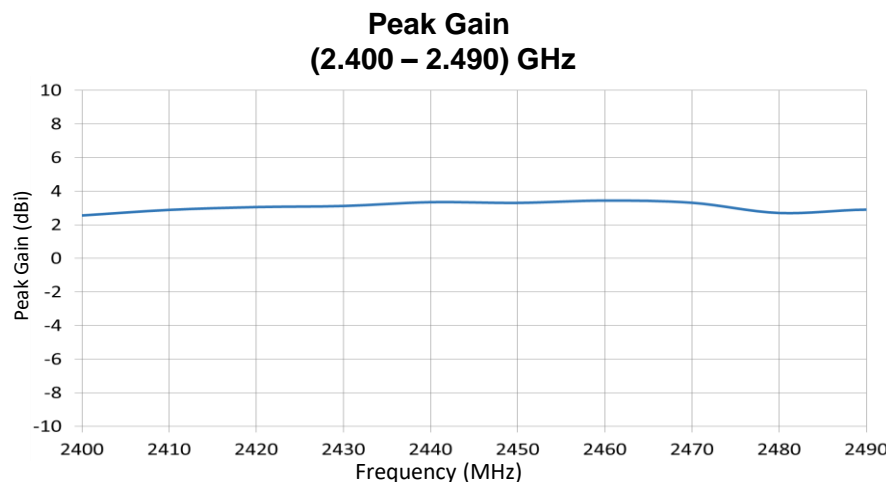
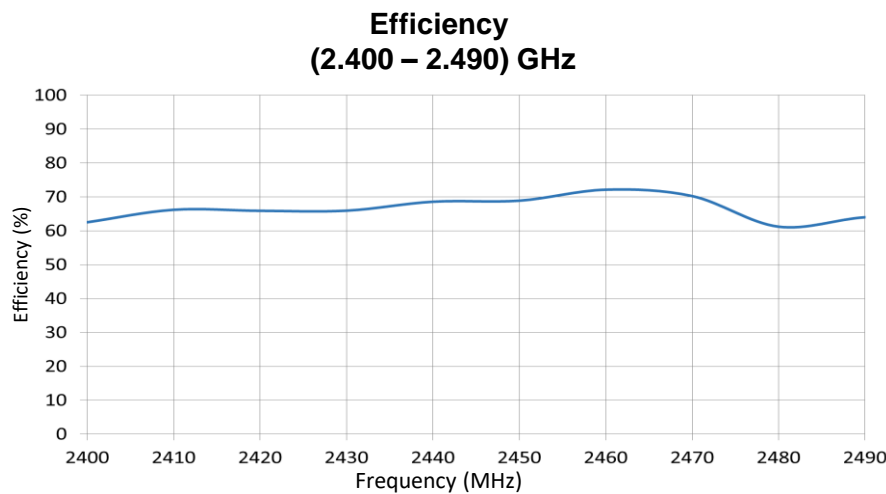
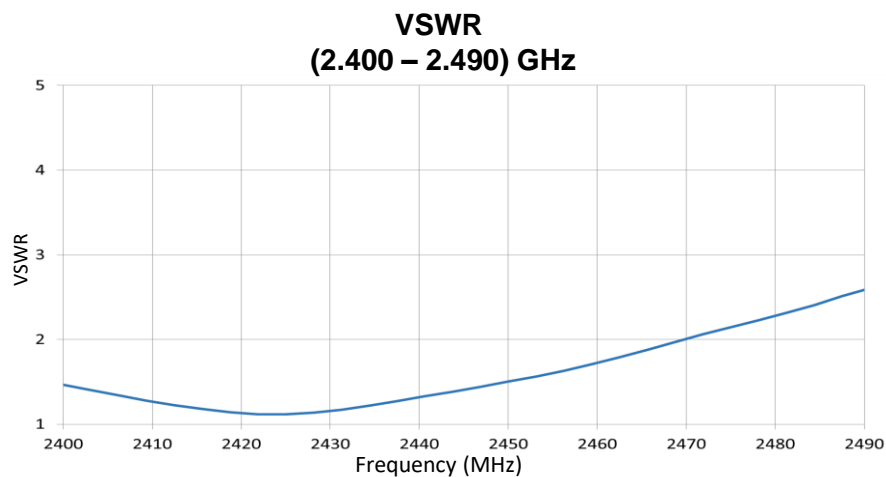
Part Number	A (mm)	B (mm)
9001978-01	(55)	(25)

*Dimensions in () parenthesis are Reference Only.



Appendix 1 BT KYOCERA AVX Embedded Ceramic Antenna Specifications
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

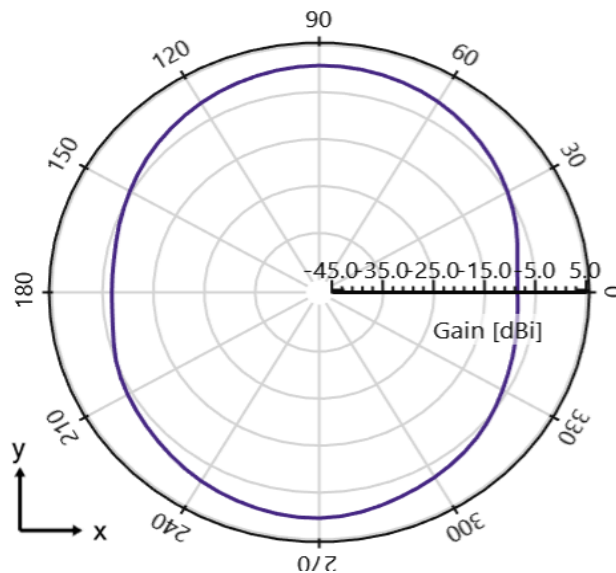
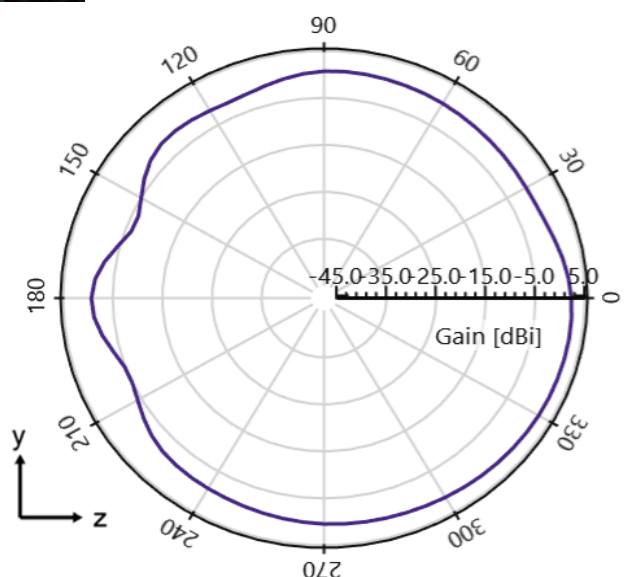
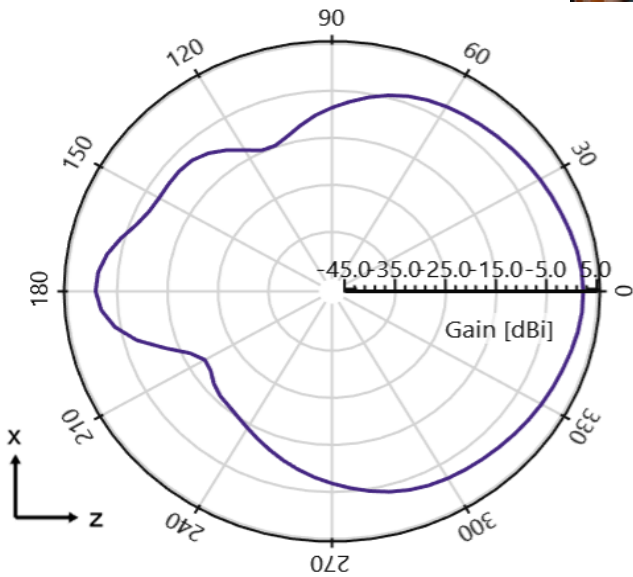
VSWR, Efficiency, and Peak Gain Plots
 Typical Performance on 55 x 25 mm PCB



Appendix 1 BT KYOCERA AVX Embedded Ceramic Antenna Specifications
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

Antenna Radiation Patterns

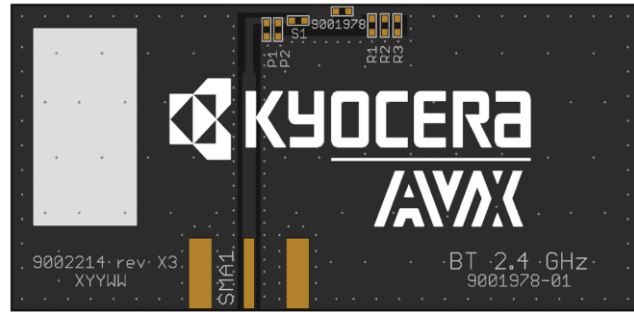
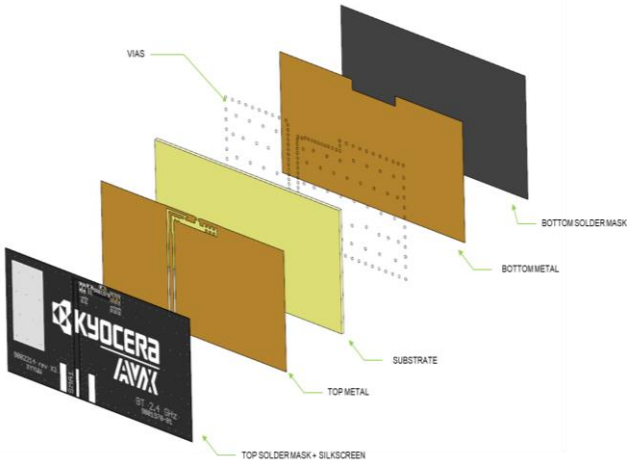
Typical Performance on 55 x 25 mm PCB
 Measured @ 2.440 GHz



Appendix 1 BT KYOCERA AVX Embedded Ceramic Antenna Specifications
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

Antenna Layout (9001978-01)

Typical layout dimensions (mm)



- TOP METAL WITH PLATING
- TOP SOLDER MASK

* VIAS: Diam. 0.2mm, (no vias on transmission lines).
 Via holes must be covered by solder mask

Pin Description

Pin#	Description
1	Feed
2	Ground

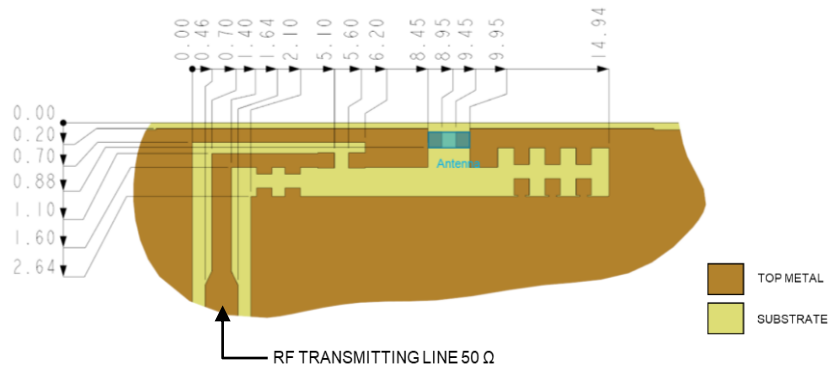
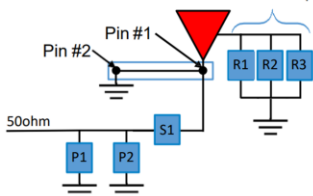
Matching Pi Network (Demo Board)

Component	Value	Tolerance
P1	4.7nH	±0.1nH
S1	0Ω	N/A
P2	N/A	N/A
R1	0Ω	N/A
R2	N/A	N/A
R3	N/A	N/A

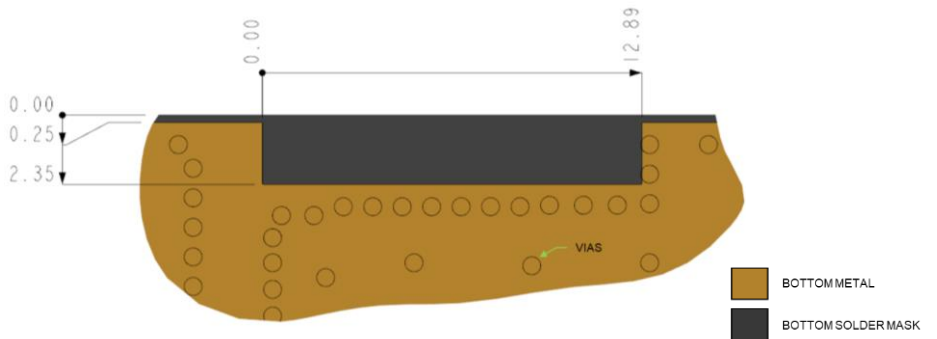
*Actual matching values depend on customer design



*0Ω may be added to shift frequency higher



- TOP METAL
- SUBSTRATE



- BOTTOM METAL
- BOTTOM SOLDER MASK

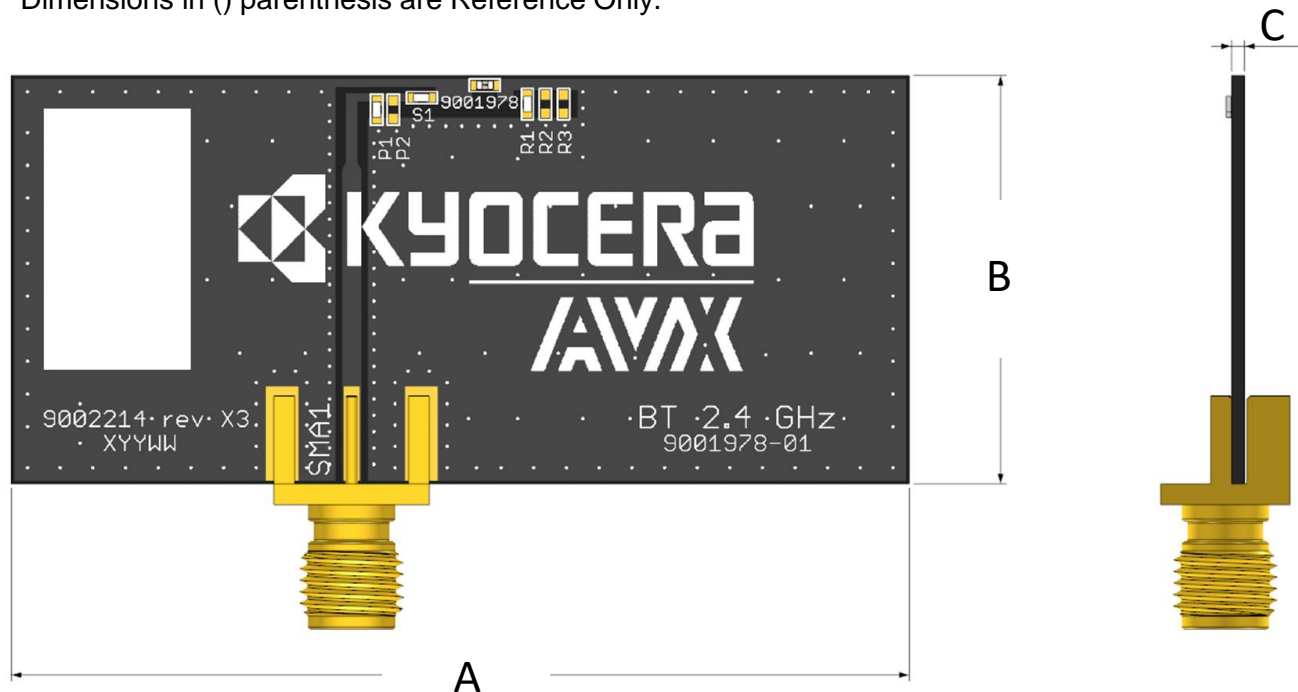
Appendix 1 BT KYOCERA AVX Embedded Ceramic Antenna Specifications
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

Antenna Demo Board (9001978-01)

Typical layout dimensions (mm)

Part Number	A	B	C
9001978-01	(55.0)	(25.0)	(0.80)

*Dimensions in () parenthesis are Reference Only.



Appendix 2 UWB KYOCERA AVX Embedded Ceramic Antenna Specifications
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

Appendix 2

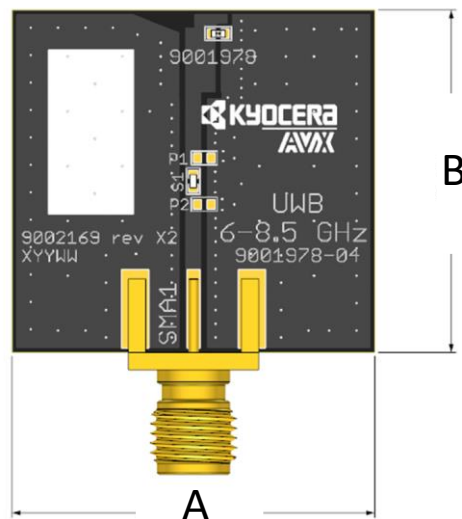
Appendix 2 gives instructions on how to match antenna through updated layout and impedance matching network for UWB (6000-8500 MHz)

Frequency (MHz)	6000 - 8500
Peak Gain (dBi)	5.7
Efficiency (%)	80
VSWR	<2.6:1
Feed Point Impedance	50 Ω unbalanced

*Data shown above has Appendix 2 matching applied on 26.5 x 25.0 mm pcb.

Part Number	A (mm)	B (mm)
9001978-04	(26.5)	(25.0)

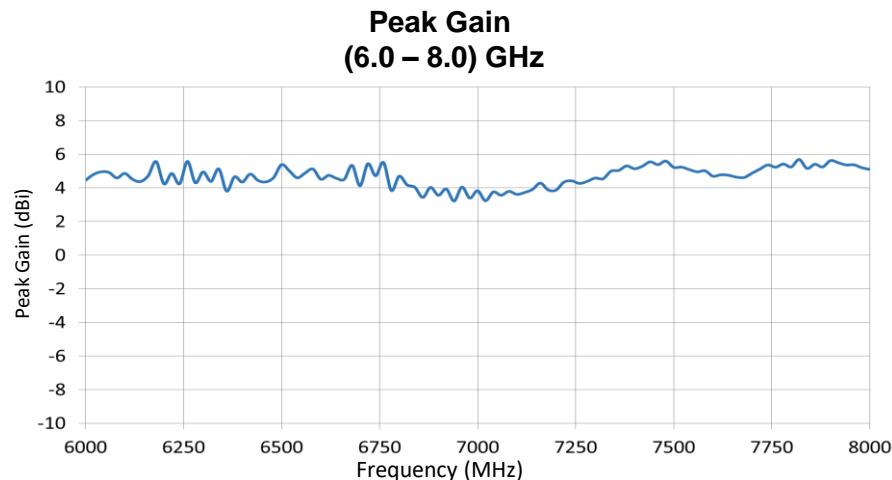
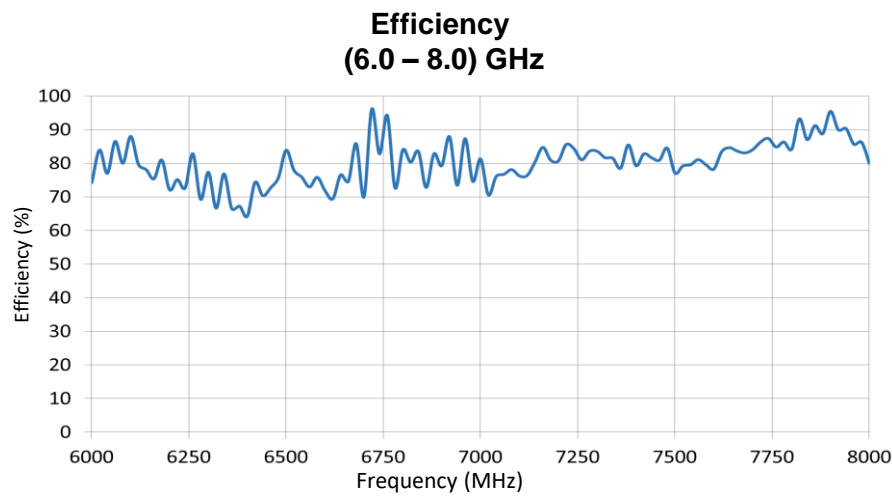
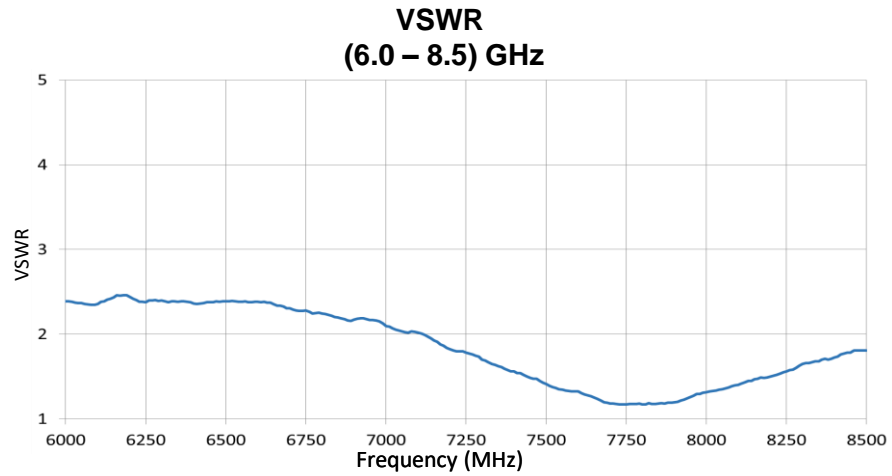
*Dimensions in () parenthesis are Reference Only.



Appendix 2 UWB KYOCERA AVX Embedded Ceramic Antenna Specifications
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

VSWR, Efficiency, and Peak Gain Plots (9001978-04)

Typical Performance on 26.5 x 25.0 mm PCB

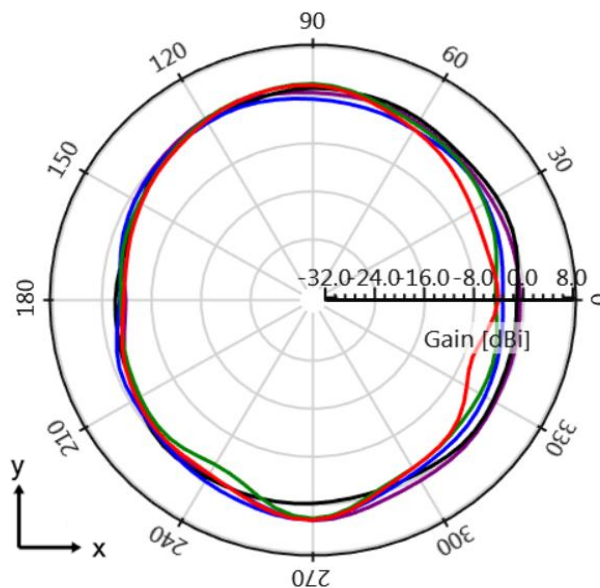
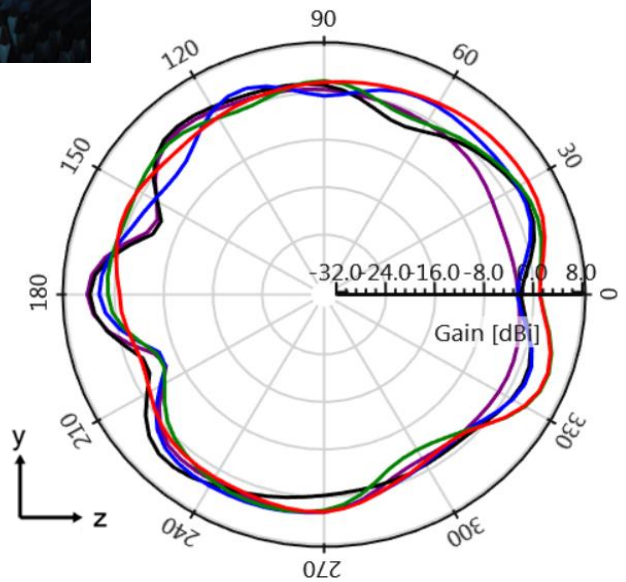
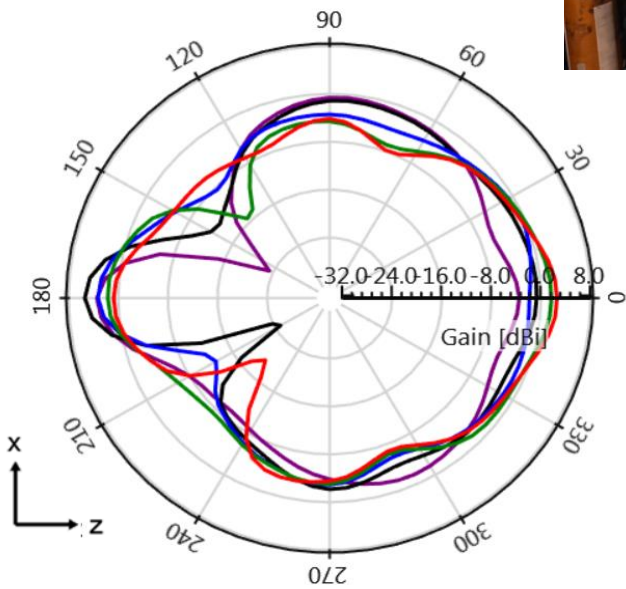


Appendix 2 UWB KYOCERA AVX Embedded Ceramic Antenna Specifications
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

Antenna Radiation Patterns (9001978-04)

Typical Performance on 26.5 x 25.0 mm PCB
 Measured @ 6000, 6500, 7000, 7500, 8000 MHz

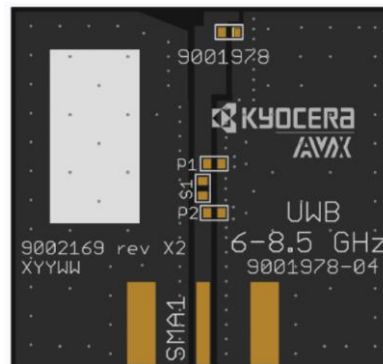
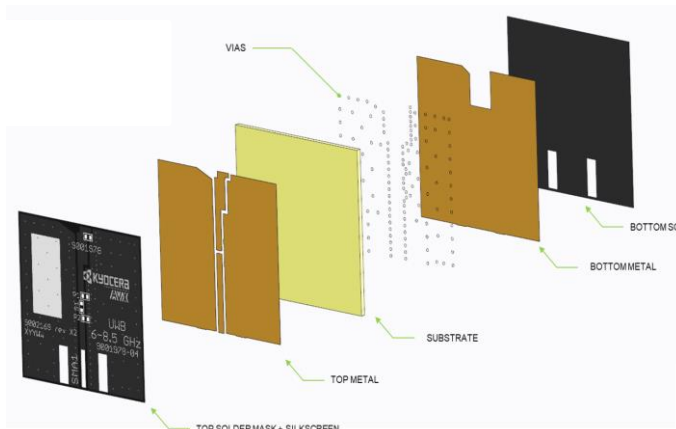
- 6000 MHz
- 6500 MHz
- 7000 MHz
- 7500 MHz
- 8000 MHz



Appendix 2 UWB KYOCERA AVX Embedded Ceramic Antenna Specifications
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

Antenna Layout (9001978-04)

Typical layout dimensions (mm)



- TOP METAL WITH PLATING
- TOP SOLDER MASK

* VIAS: Diam. 0.2mm, (no vias on transmission lines).
 Via holes must be covered by solder mask

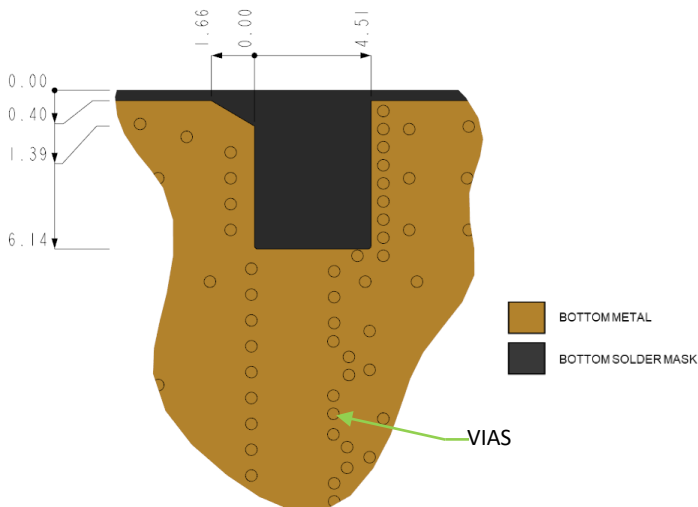
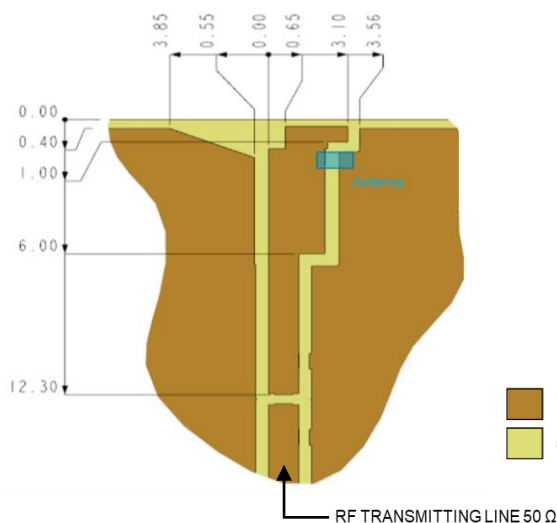
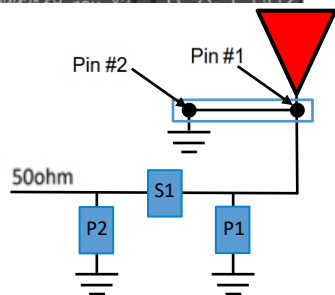
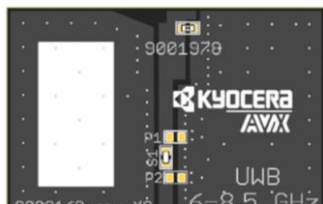
Pin Description

Pin#	Description
1	Feed
2	Ground

Matching Pi Network (Demo Board)

Component	Value	Tolerance
P1	DNI	N/A
S1	0Ω	N/A
P2	DNI	N/A

*Actual matching values depend on customer design



Appendix 2 UWB KYOCERA AVX Embedded Ceramic Antenna Specifications
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs

Antenna Demo Board (9001978-04)

Typical layout dimensions (mm)

Part Number	A	B	C
9001978-04	(26.5)	(25.0)	(0.80)

*Dimensions in () parenthesis are Reference Only.

