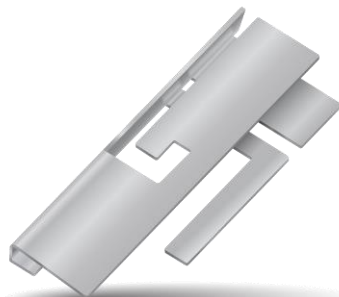


Part No. A1000146

Automotive Wi-Fi 6 & Wi-Fi 6E or CBRS/n78 Stamped Metal Antenna

2.4 / 5 GHz or 3.3 – 3.8 GHz

Supports: Wi-Fi applications, Automotive, Bluetooth, Zigbee, WLAN



*CBRS/n78 layout offered in Appendix 1

**Wi-Fi 6 & Wi-Fi 6E or CBRS/n78
Stamped Metal Embedded Antenna**
2.400 GHz – 2.485 GHz,
5150 GHz - 5825 GHz,
5925 GHz – 7125 GHz,
3300 GHz – 3800 GHz

KEY BENEFITS

Stay-in-Tune

KYOCERA AVX 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
- Cellular, Headsets, Tablets
- Gateway, Access Point
- Handheld
- Telematics
- Tracking
- Healthcare (FDA Class I) Applications
- M2M, Industrial devices
- Smart Grid
- OBD-II

KYOCERA AVX A-Series automotive antennas deliver on the key needs of device designers for higher functionality.

KYOCERA AVX has completed rigorous testing to qualify the A-series antennas for automotive applications. Although the AEC-Q200 standard does not include antenna products, all testing has been done following applicable AEC-Q200 requirements and procedures as closely as possible. Customers must provide additional quality requirements, if any, to drive additional compliance testing.

Electrical Specifications

Typical Characteristics, on 125 x 45 mm PCB

Frequency (GHz)	2.400 – 2.485	5150 – 5.825	5925 - 7125	3.300– 3.800
Peak Gain	1.7 dBi	4.1 dBi	3.8 dBi	Refer to Appendix 1
Average Efficiency	81%	68%	64%	
VSWR Match	2.0:1 max	2.0:1 max	2.2:1 max	
Feed Point Impedance	50 ohms unbalanced			
Polarization	Linear			
Power Handling	0.5 Watt CW			

Mechanical Specifications & Ordering Part Number

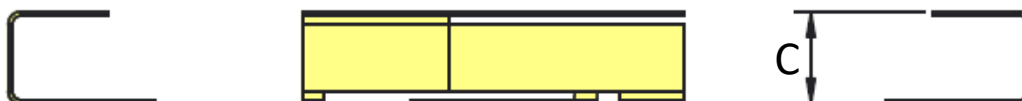
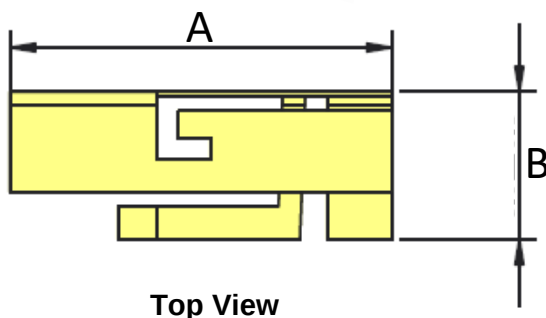
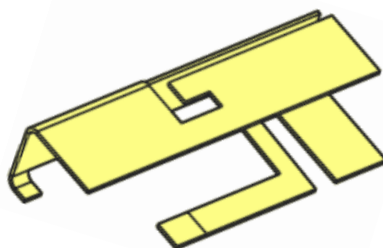
Ordering Part Number	A1000146
Size (mm)	17.85 x 6.9 x 4.3
Mounting	SMT
Weight (grams)	0.35
Packaging	Tape & Reel
Demo Boards	1005456 (Wi-Fi / Wi-Fi6E) 1000146-03 (n78 / CBRS)
Temperature Range	-50/+125 °C
Temperature Cycle	IEC 60068-2-14
Temperature Exposure	Mil-STD-202 Method 108
High Temperature Humidity	MIL-STD-202 Method 103. per spec.: 168 Hrs.
Mechanical Shock	IEC 60068-2-27
Vibration	IEC 60068-2-6
IMDS and PPAP available	
Additional resources	Download DXF, Gerber and 3D Fit Files

Automotive Wi-Fi 6 & Wi-Fi 6E KYOCERA AVX Stamped Metal Embedded Antenna.
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

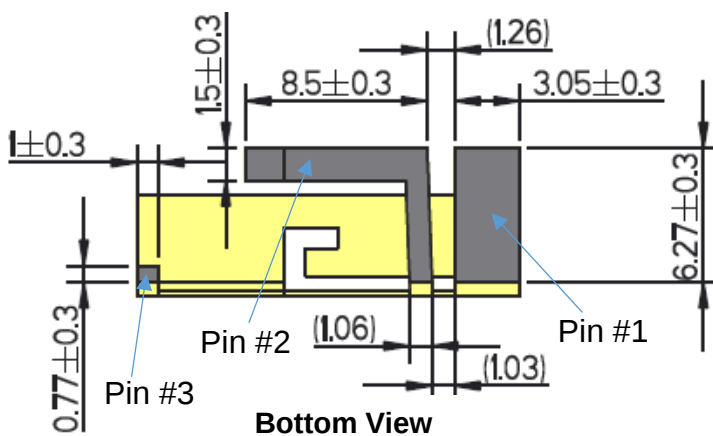
Antenna Dimensions

Typical antenna dimensions (mm)

Part Number	A	B	C
A1000146	17.85 ± 0.3	6.9 ± 0.3	4.3 ± 0.4



Height

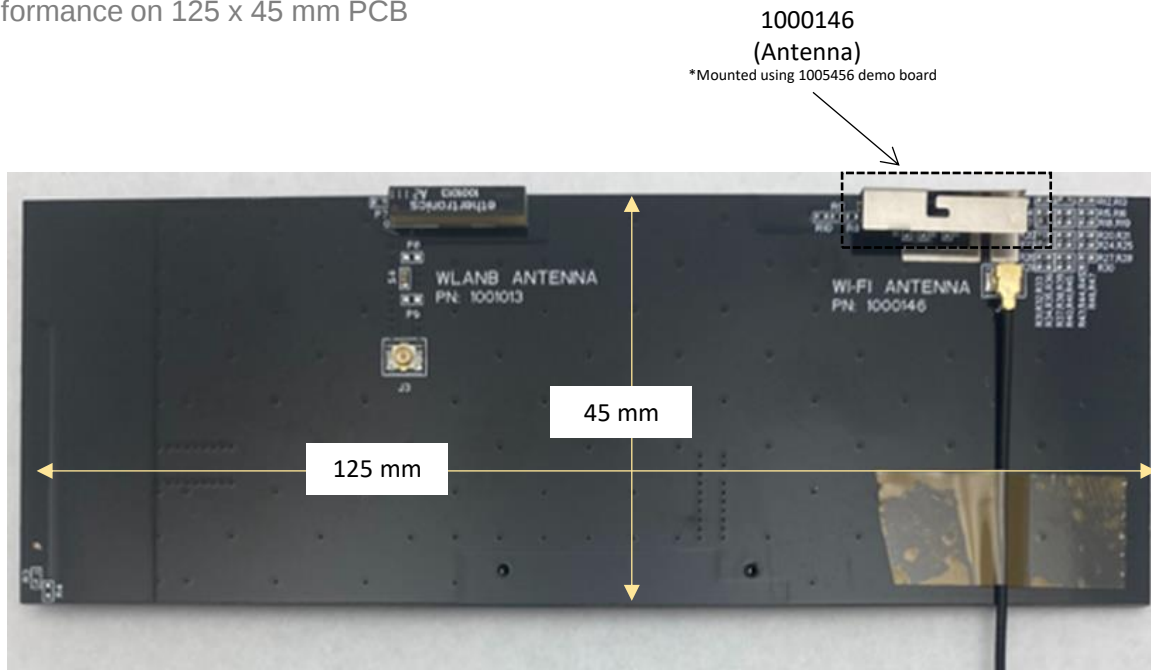


Pin	Description
1	Feed
2	Ground
3	Dummy Pad

Automotive Wi-Fi 6 & Wi-Fi 6E KYOCERA AVX Stamped Metal Embedded Antenna.
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Test Setup (1005456)

Typical Performance on 125 x 45 mm PCB

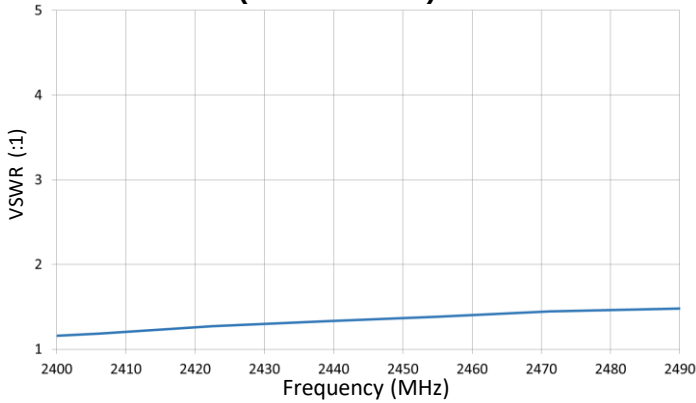


Automotive Wi-Fi 6 & Wi-Fi 6E KYOCERA AVX Stamped Metal Embedded Antenna.
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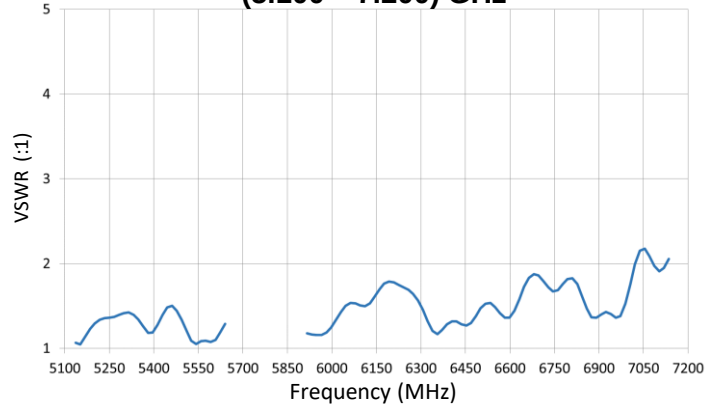
VSWR, Efficiency, and Peak Gain Plots

Typical Performance on 125 x 45 mm PCB

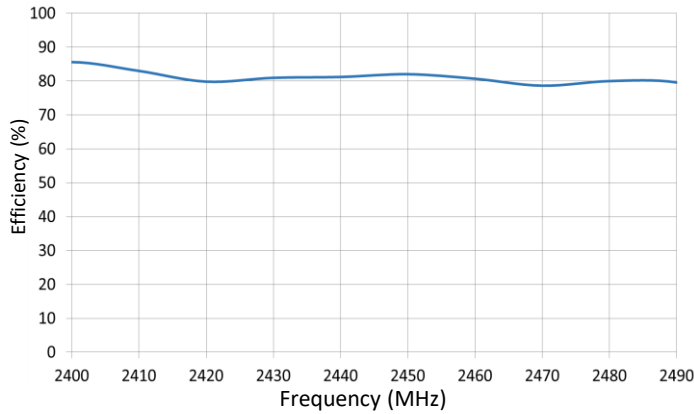
VSWR
(2.400 – 2.490) GHz



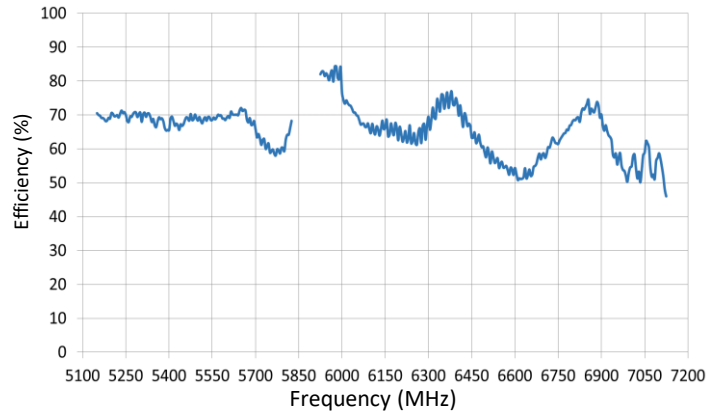
VSWR
(5.100 – 7.200) GHz



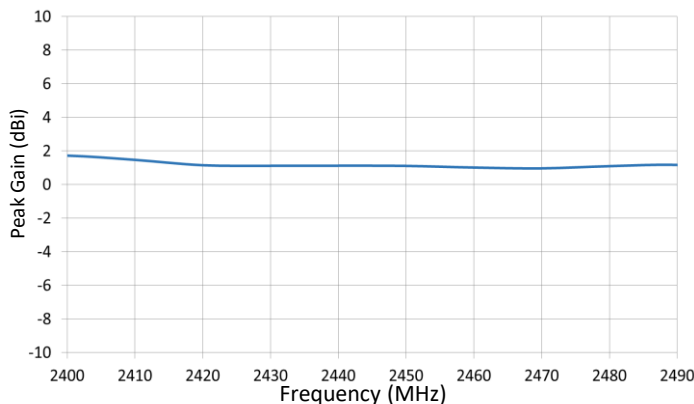
Efficiency
(2.400 – 2.490) GHz



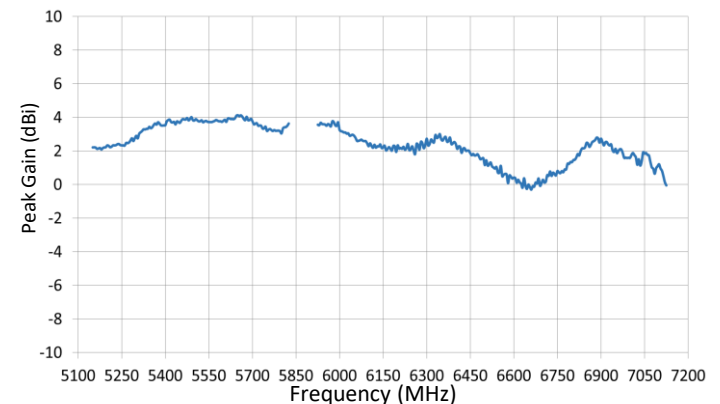
Efficiency
(5.100 – 7.200) GHz



Peak Gain
(2.400 – 2.490) GHz



Peak Gain
(5.100 – 7.200) GHz

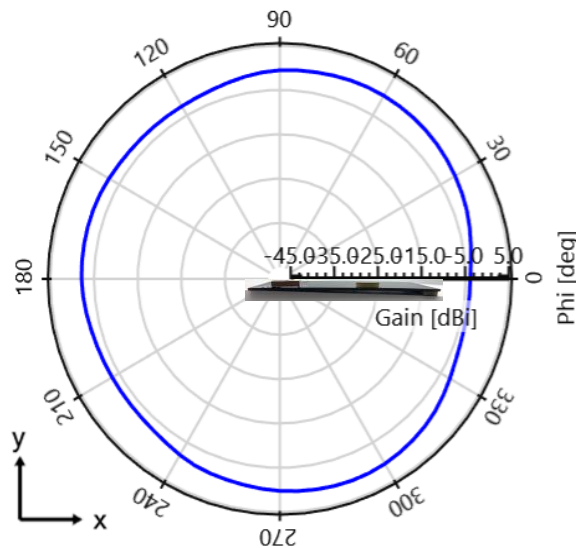
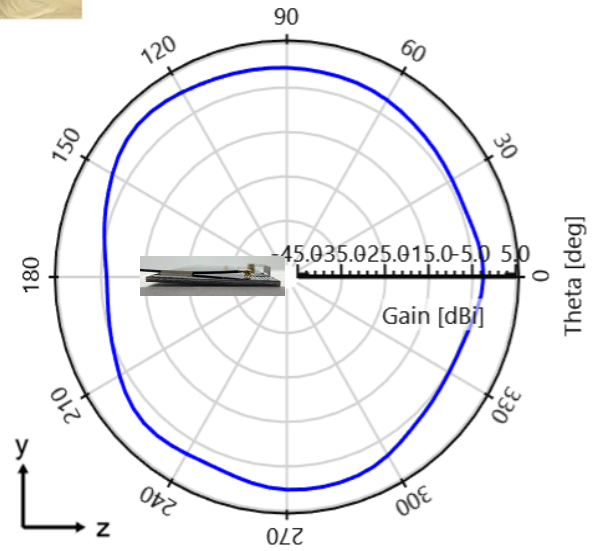
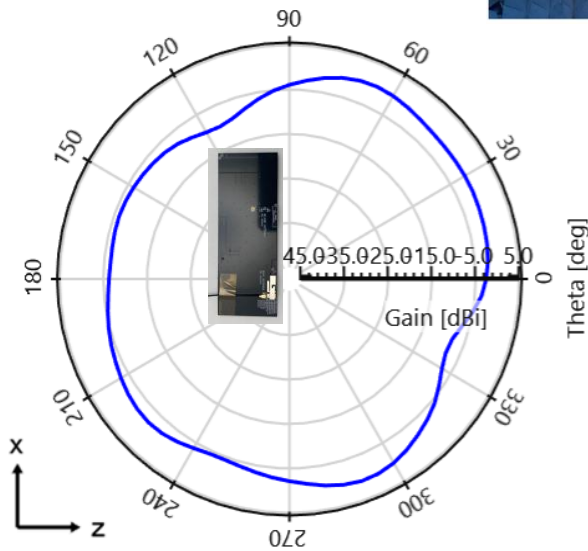
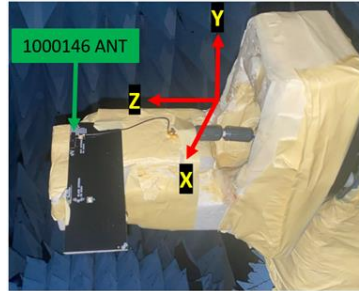


Automotive Wi-Fi 6 & Wi-Fi 6E KYOCERA AVX Stamped Metal Embedded Antenna.
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

Antenna Radiation Patterns

Typical Performance on 125 x 45 mm PCB

Measured @ 2.440 GHz

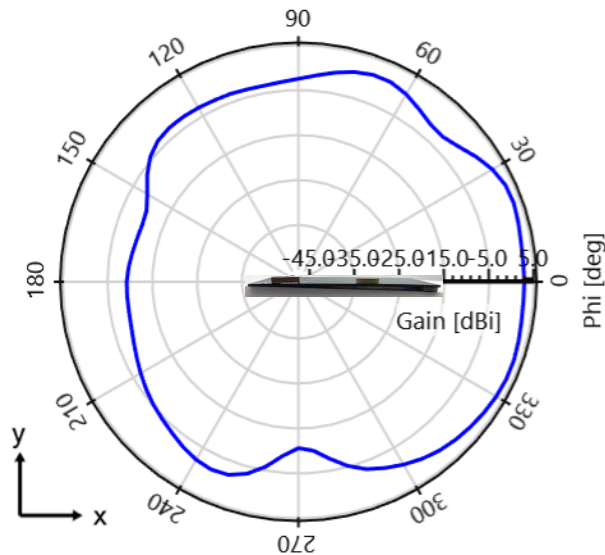
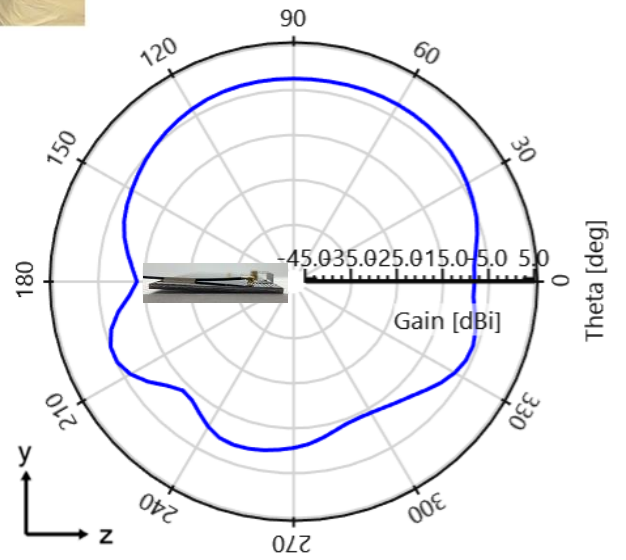
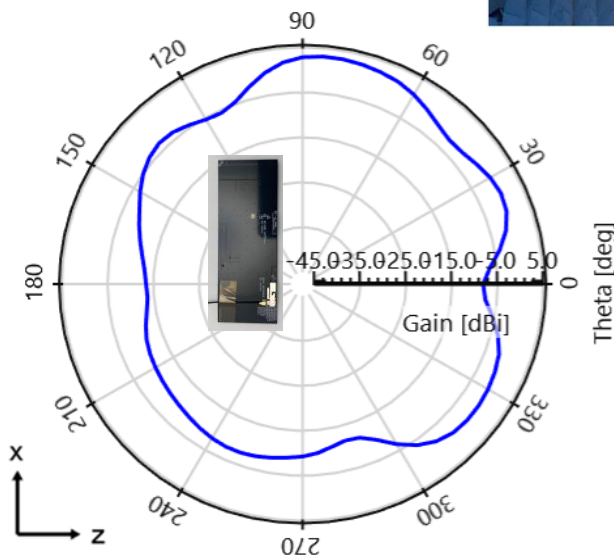
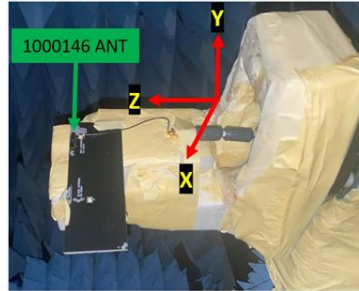


Automotive Wi-Fi 6 & Wi-Fi 6E KYOCERA AVX Stamped Metal Embedded Antenna.
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Antenna Radiation Patterns

Typical Performance on 125 x 45 mm PCB

Measured @ 5.550 GHz

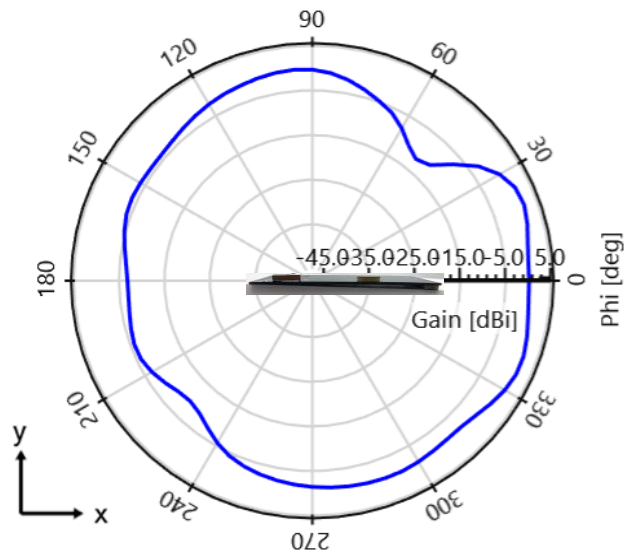
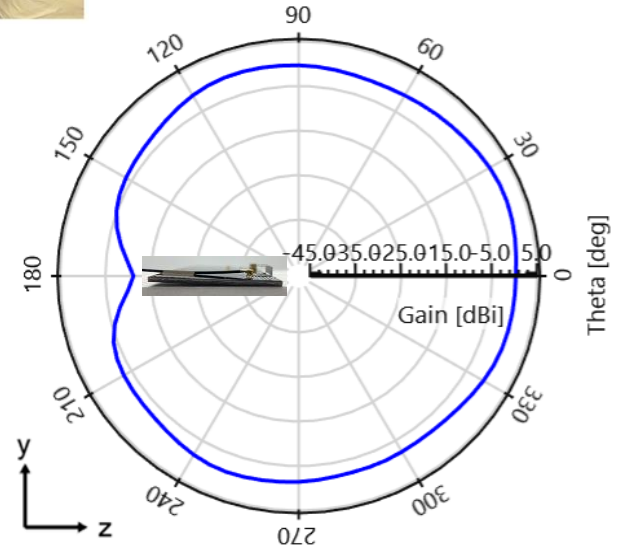
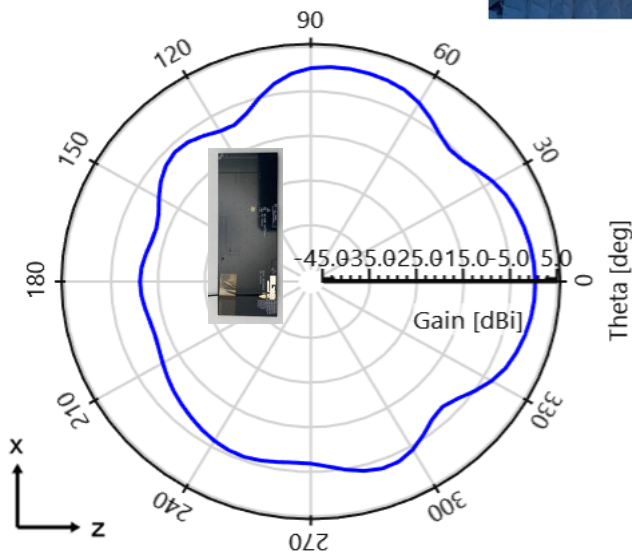
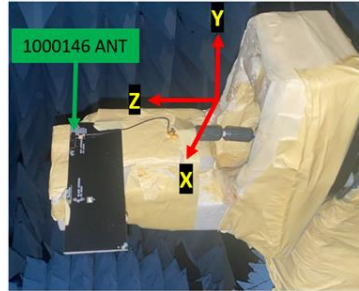


Automotive Wi-Fi 6 & Wi-Fi 6E KYOCERA AVX Stamped Metal Embedded Antenna.
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

Antenna Radiation Patterns

Typical Performance on 125 x 45 mm PCB

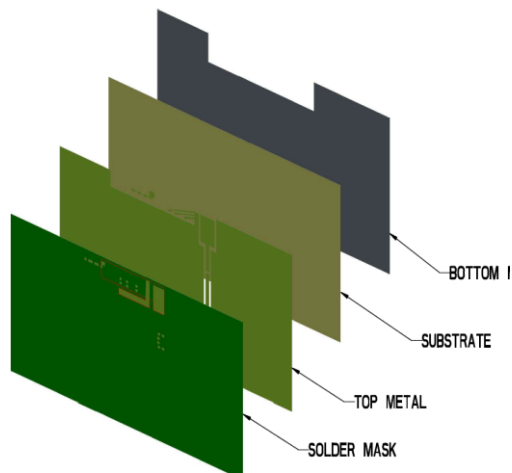
Measured @ 6.425 GHz



Automotive Wi-Fi 6 & Wi-Fi 6E KYOCERA AVX Stamped Metal Embedded Antenna.
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

Antenna Layout (Minor Tuning Layout)

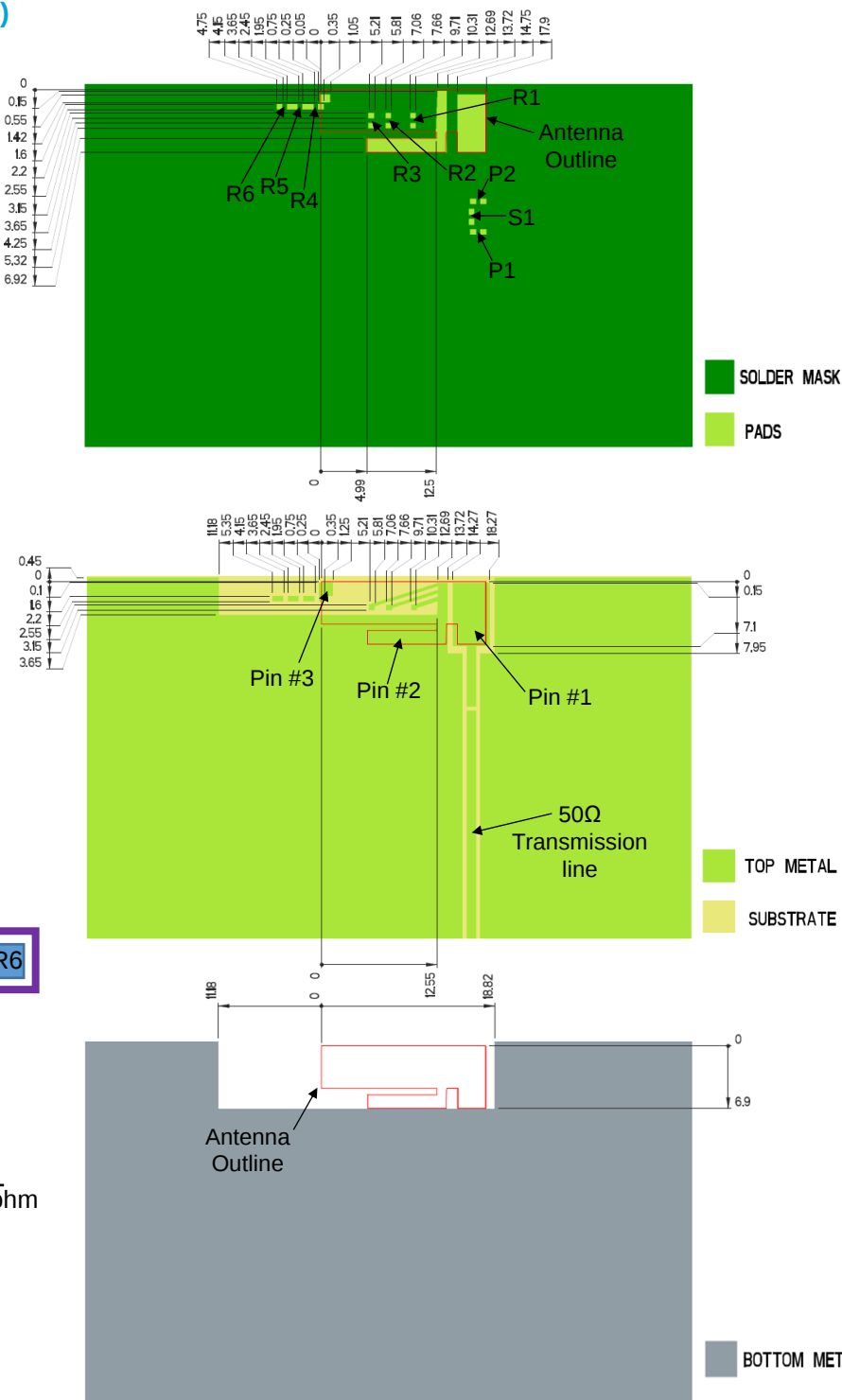
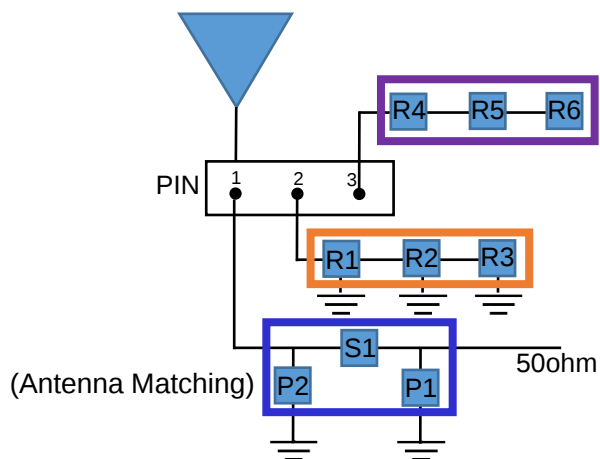
Typical layout dimensions (mm)



Note:
Layout has minor tuning capabilities to allow for small antenna footprint.

Pin Descriptions

Pin#	Description
1	Feed
2	Ground
3	Dummy Pad



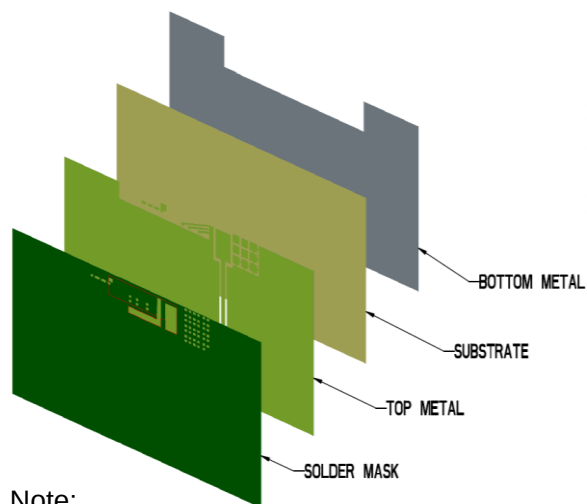
Antenna Matching & Tuning Component Values

	P1	S1	P2	R1 – R3	R4 – R6
Default Values	DNI	0Ω	DNI	DNI	DNI
Component Tolerance	N/A	N/A	N/A	N/A	N/A

Automotive Wi-Fi 6 & Wi-Fi 6E KYOCERA AVX Stamped Metal Embedded Antenna.
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

Antenna Layout (Major Tuning Layout)

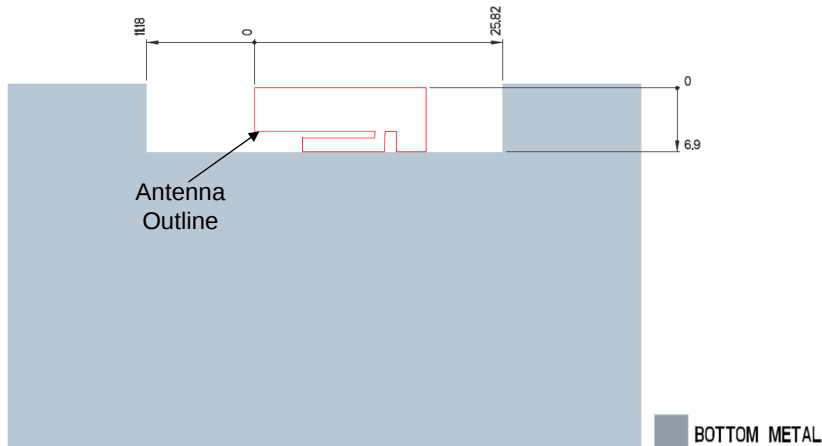
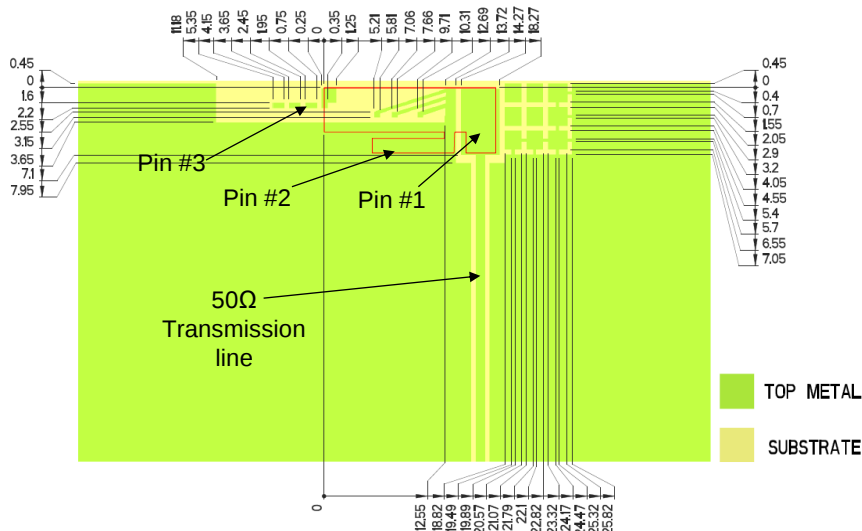
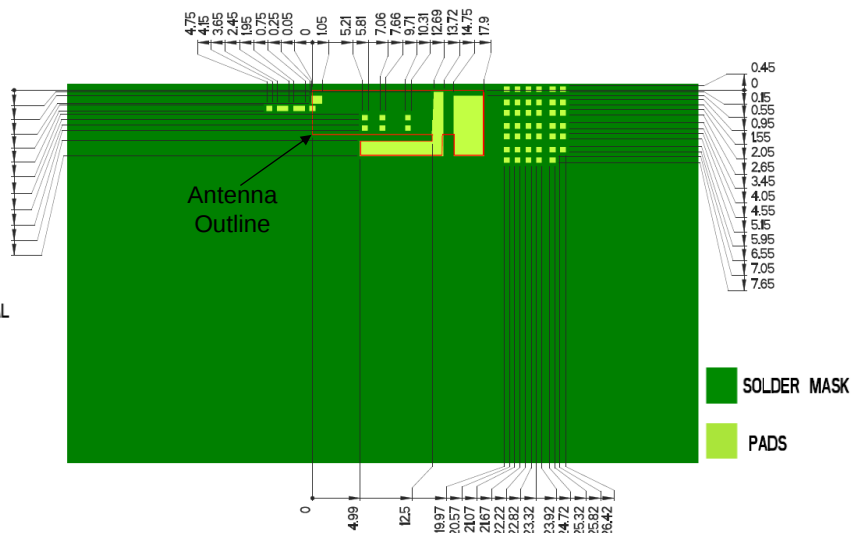
Typical layout dimensions (mm)



Note:
Layout has Major tuning capabilities to allow for robust tuning after board spin, instructions on [Antenna Matching Structure](#) page.

Pin Descriptions

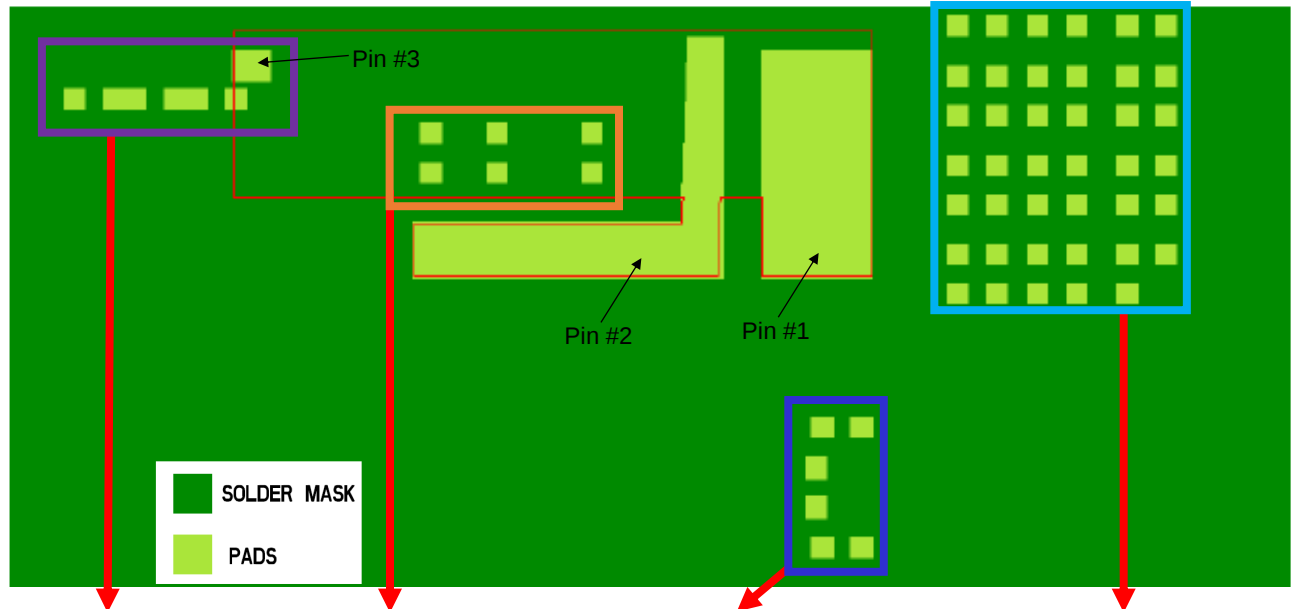
Pin#	Description
1	Feed
2	Ground
3	Dummy Pad



Automotive Wi-Fi 6 & Wi-Fi 6E KYOCERA AVX Stamped Metal Embedded Antenna.
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Antenna Matching Structure (Major Tuning Structure)

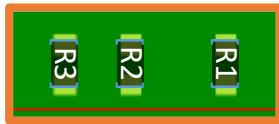
Typical matching values on 125 x 45 mm PCB



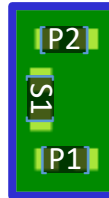
Low Band Tuning
(Add to Shift Low)



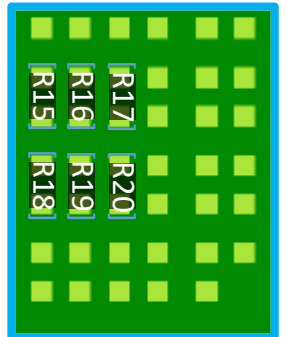
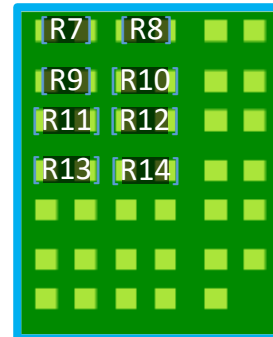
Low Band Tuning
(Add to Shift High)



Antenna Matching

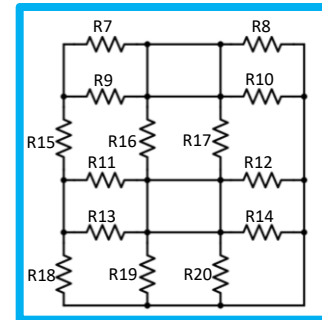
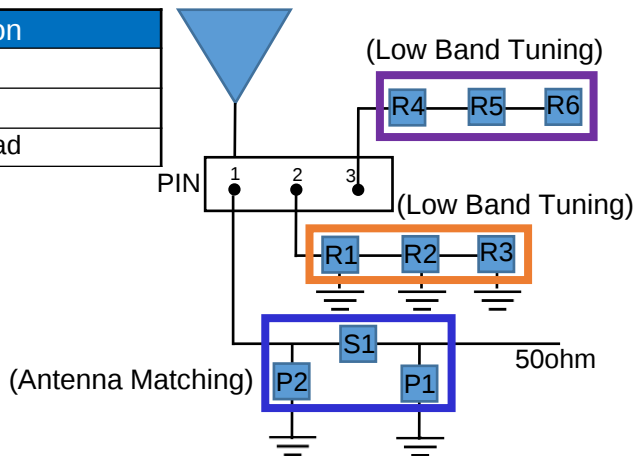


High Band Tuning
(Add to Shift High, DNI to Shift Low)



Pin Descriptions

Pin#	Description
1	Feed
2	Ground
3	Dummy Pad



*Extend ground towards antenna feed with 0Ω component(s). R7- R20 can improve high band bandwidth/ performance with ground coupling.

	P1	S1	P2	R1 – R3	R4 – R6	R7 – R14	R15 - R20
Default Values	DNI	0Ω	DNI	DNI	DNI	DNI	DNI
Tolerance	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Appendix 1 Automotive CBRs/n78 KYOCERA AVX Stamped Metal Embedded Antenna.
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 CBRs/n78 performances through layout and impedance matching network.

(3.300 – 3.800 GHz)

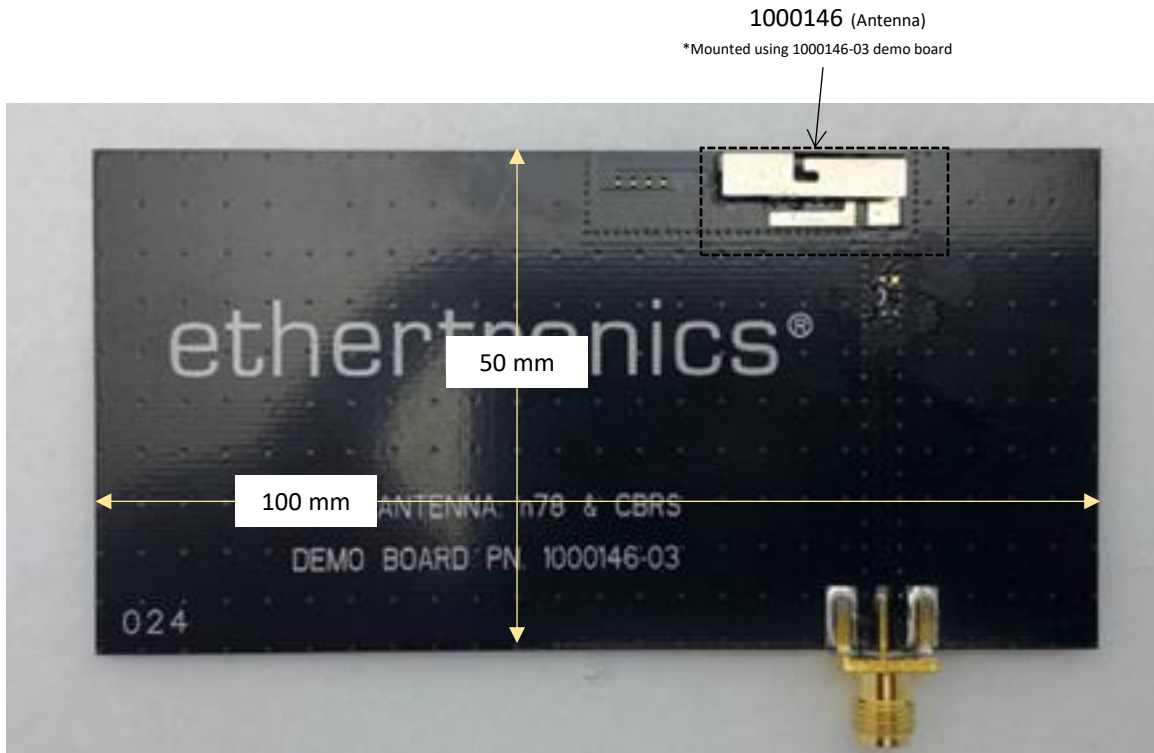
Frequency (GHz)	3.300 – 3.800
Peak Gain	4.21 dBi
Average Efficiency	76%
VSWR Match	2.0:1 max
Feed Point Impedance	50 ohms unbalanced
Polarization	Linear
Power Handling	0.5 Watt CW

*Data shown above has Appendix 1 matching applied on (1000146-03) 100 x 50 mm pcb.

Appendix 1 Automotive CBRS/n78 KYOCERA AVX Stamped Metal Embedded Antenna.
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

Appendix 1 (1000146-03)

Typical Performance on 100 x 50 mm PCB



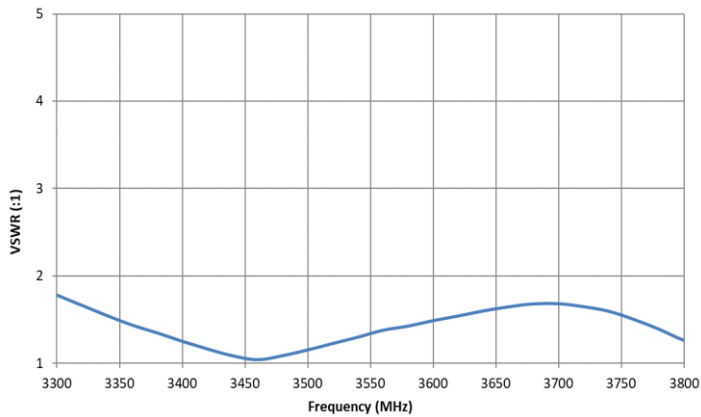
Appendix 1 Automotive CBRS/n78 KYOCERA AVX Stamped Metal Embedded Antenna.
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

Appendix 1 VSWR and Efficiency Plots

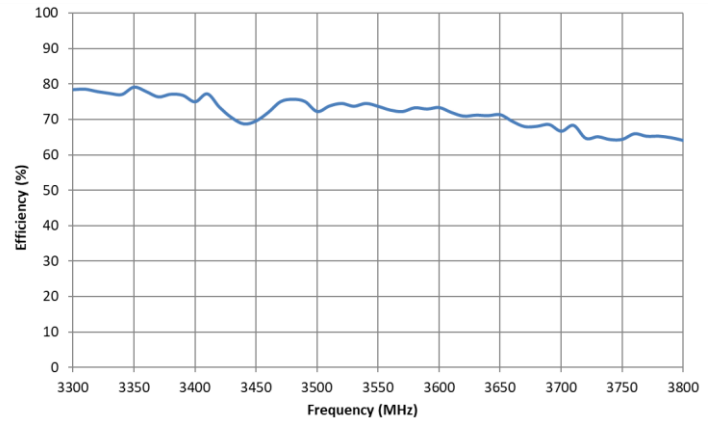
Typical Performance on 100 x 50 mm PCB



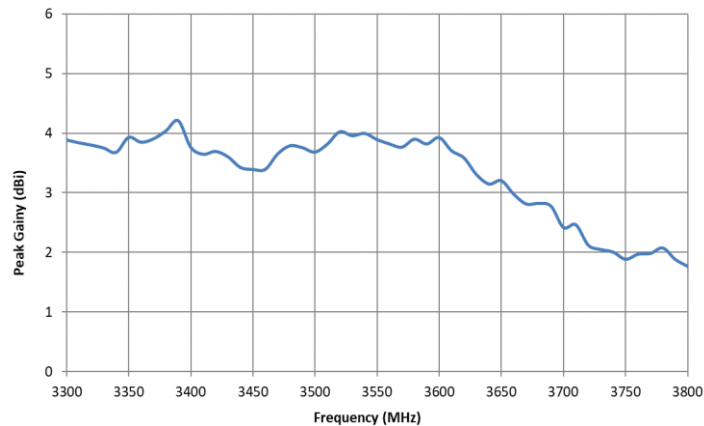
VSWR



Efficiency



Peak Gain

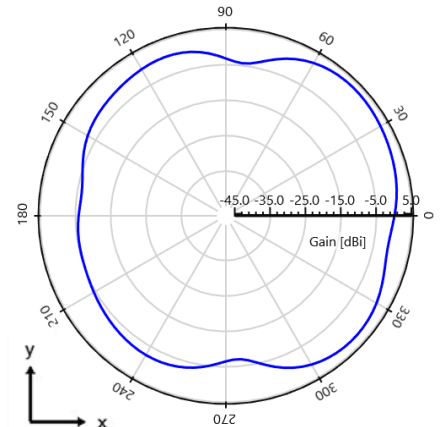
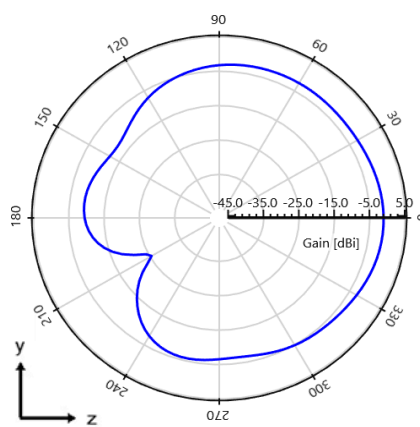
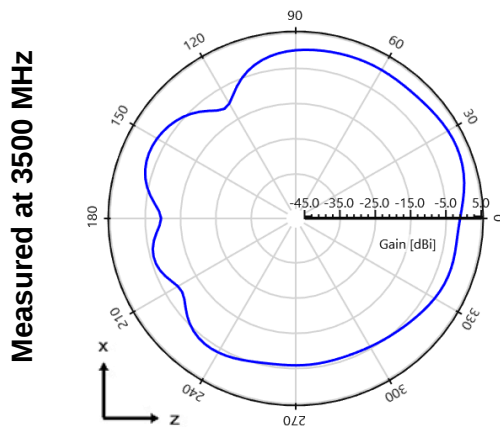


Appendix 1 Automotive CBRS/n78 KYOCERA AVX Stamped Metal Embedded Antenna.
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

Appendix 1 Antenna Radiation Patterns

Typical Performance on 100 x 50 mm PCB

Measured @ 3500 MHz



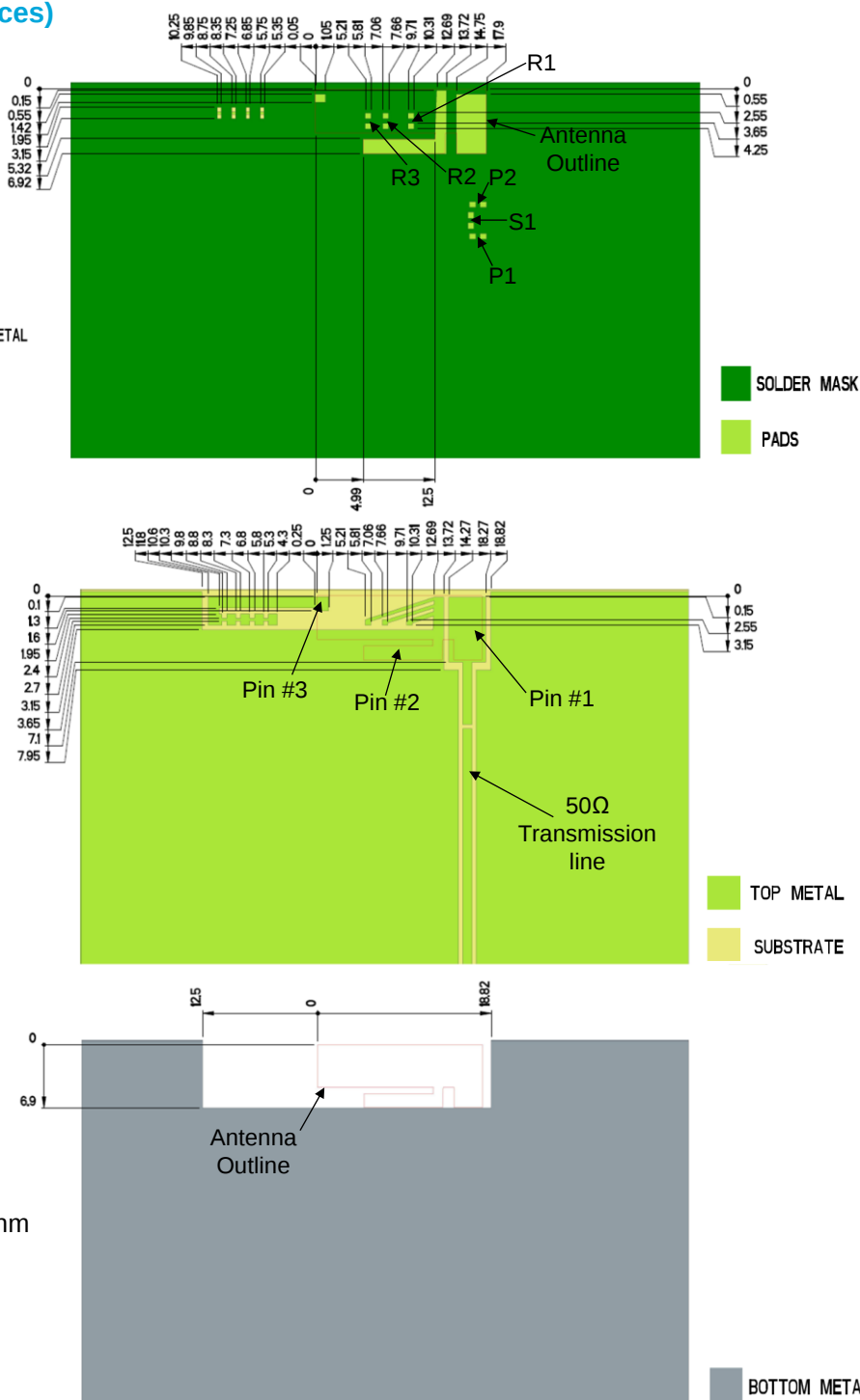
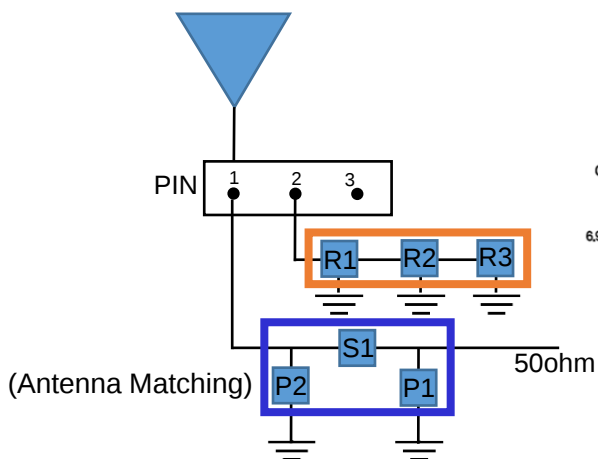
Antenna Layout (CBRS/n78 performances)

Exploded view diagram of a PCB showing the following layers from front to back:

- SOLDER MASK
- TOP METAL
- SUBSTRATE
- BOTTOM METAL

Pin Descriptions

Pin#	Description
1	Feed
2	Ground
3	Dummy Pad

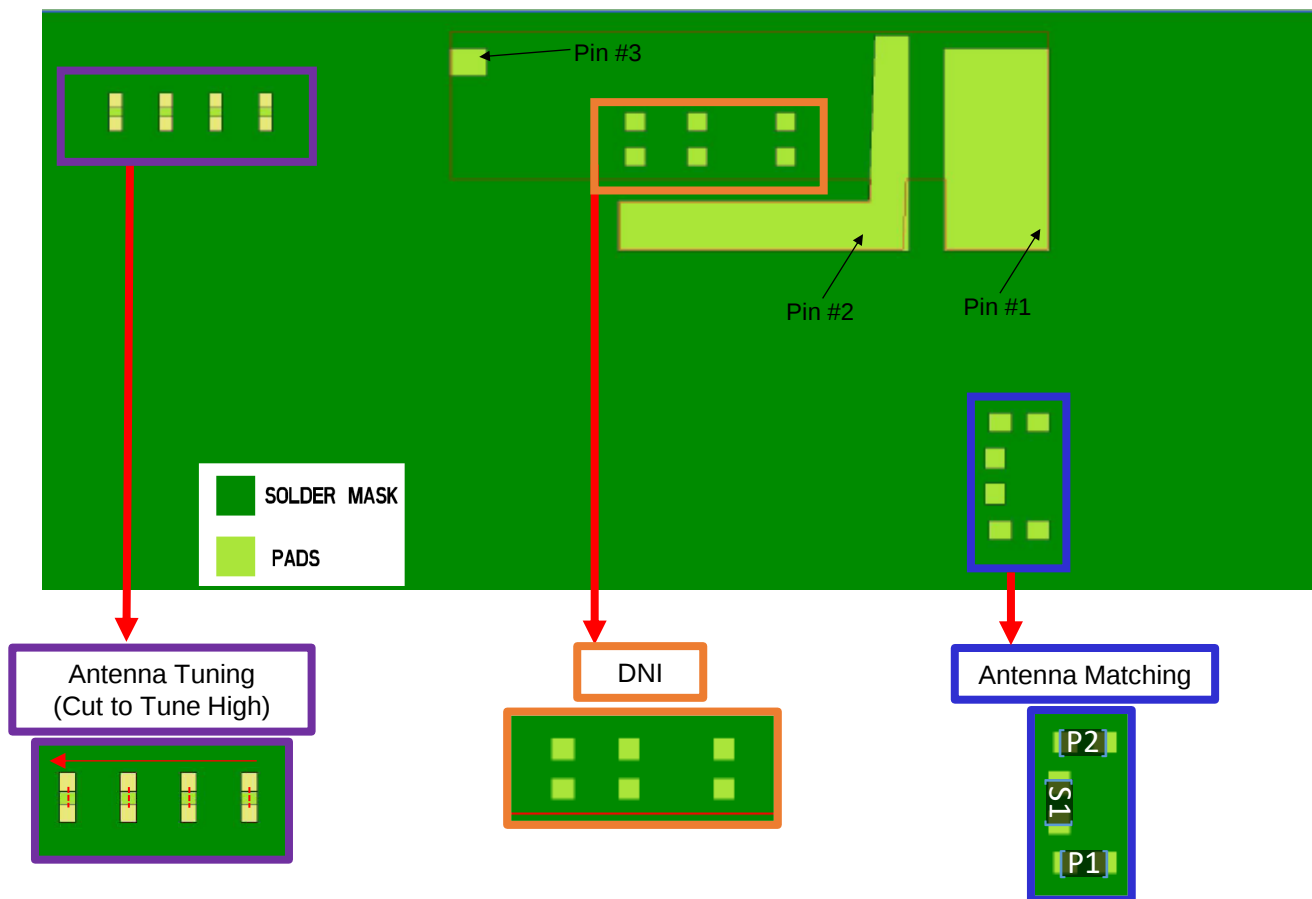


	P1	S1	P2	R1 – R3
Default Values	DNI	1.5 nH	0.8 pF	DNI
Component Tolerance	N/A	(+/-0.05)	(+/-0.05)	N/A

Appendix 1 Automotive CBRS/n78 KYOCERA AVX Stamped Metal Embedded Antenna.
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

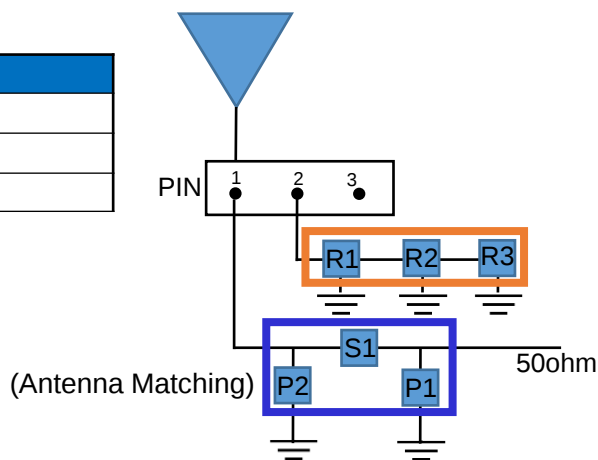
Antenna Matching Structure

Typical matching values on 100 x 50 mm PCB



Pin Descriptions

Pin#	Description
1	Feed
2	Ground
3	Dummy Pad



Antenna Matching & Tuning Component Values

	P1	S1	P2	R1 – R3
Default Values	DNI	1.5 nH	0.8 pF	DNI
Component Tolerance	N/A	(+/-0.05)	(+/-0.05)	N/A

Appendix 1 Automotive CBRS/n78 KYOCERA AVX Stamped Metal Embedded Antenna.
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

Additional Resources – A1000146 Wi-Fi 6 & Wi-Fi 6E Stamped Metal Antenna

3D Fit File:

https://www.kyocera-avx.com/download/antennas/ME-FIT/1000146_ME-fit.zip

DXF File:

Standard Layout : https://www.kyocera-avx.com/download/antennas/3D-DXF/1000146-01_3D-DXF.zip

Extended layout : https://www.kyocera-avx.com/download/antennas/3D-DXF/1000146-02_3D-DXF.zip

Gerber File:

Standard Layout : https://www.kyocera-avx.com/download/antennas/GERBER/1000146-01_GERBERS.zip

Extended layout : https://www.kyocera-avx.com/download/antennas/GERBER/1000146-02_GERBERS.zip

Additional Resources – A1000146 Automotive CBRS/n78 Stamped Metal Antenna

3D Fit File:

https://www.kyocera-avx.com/download/antennas/ME-FIT/1000146_ME-fit.zip

DXF File:

Standard Layout : https://www.kyocera-avx.com/download/antennas/ME-FIT/1000146_ME-fit.zip

Extended layout : https://www.kyocera-avx.com/download/antennas/3D-DXF/1000146-02_3D-DXF.zip

Gerber File:

Standard Layout : https://www.kyocera-avx.com/download/antennas/GERBER/1000146-01_GERBERS.zip

Extended layout : https://www.kyocera-avx.com/download/antennas/GERBER/1000146-02_GERBERS.zip