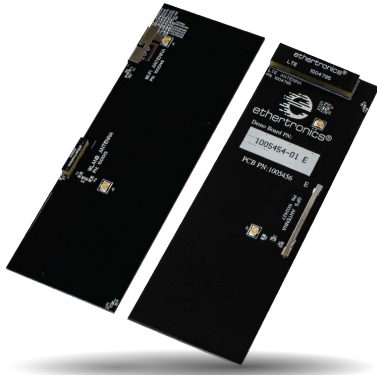


Part No. 1005454-01

LTE / GPS / BT / Wi-Fi Antenna Evaluation Board

(698-960; 1710-2400; 2500-2700) MHz + 1560-1610 MHz + 2400-2485 MHz + (2400-2485; 5000-5825) MHz

Supports: Tracking, Smart Home, Agriculture, Healthcare, Digital Signage, Logistics, Industrial Devices



KYOCERA AVX LTE / GPS / BT / Wi-Fi Antenna Evaluation Board delivers on the key needs of device designers for higher functionality and performance.

Electrical Specifications

Typical characteristics in free-space

Frequency LTE (1004795)	698~960 MHz	1710~2400 MHz	2500~2700 MHz
Peak Gain	2.7 dBi	3.2 dBi	3.8 dBi
Average Efficiency	70%	53%	51%
VSWR	<2.5:1	<3.0:1	<3.0:1
Impedance	50 Ω unbalanced		

LTE / GPS / BT / Wi-Fi Antenna Evaluation Board

(698-960 1710-2400 2500-2700)
 MHz + 1560 - 1610 MHz + 2400-2485
 MHz + (2400-2485 5000-5825) MHz

KEY BENEFITS

Reduced Costs and Time-to Market

Standard antennas eliminate design fees and cycle time associated with a custom solution, getting products to market faster.

High Performance

By optimizing antenna size, performance and emissions, customer and regulatory specifications are more easily met.

Reliability

Products are the latest RoHS & REACH version compliant.

APPLICATIONS

- Remote Monitoring
- Point of Sale
- IoT
- Gateway
- Telematics
- Tracking
- Healthcare
- M2M,
- Industrial devices
- Smart Grid
- Logistics
- Energy
- Retail

Frequency GPS (1002427)	1560~1610 MHz
Peak Gain	2.6 dBi
Average Efficiency	58%
VSWR	<2.0:1

Frequency BT (1001013)	2400~2485 MHz
Peak Gain	3.3 dBi
Average Efficiency	66%
VSWR	<2.0:1

Frequency Wi-Fi (1000146)	2400~2485 MHz	5000~5825 MHz
Peak Gain	2 dBi	4.3 dBi
Average Efficiency	66%	63%
VSWR	<2.0:1	

LTE / GPS / BT / Wi-Fi Antenna Evaluation Board Specifications.
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

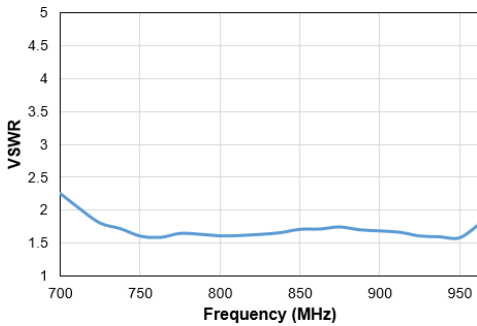
Mechanical Specifications

Ordering Part	1005454-01
Dimensions (mm)	126.5 x 45.5 x 9.07
Cables and Connectors	Compatible with U.FL Connector
Material and Color	PCB + Black
Weight (g)	25
Standard(s) Compliance	RoHS, WEEE

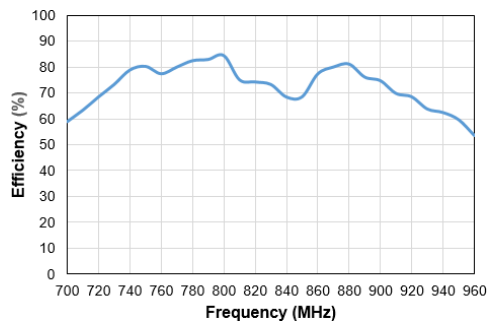
VSWR, Efficiency, Peak Gain Plots, LTE (1004795)

Typical characteristics in free-space

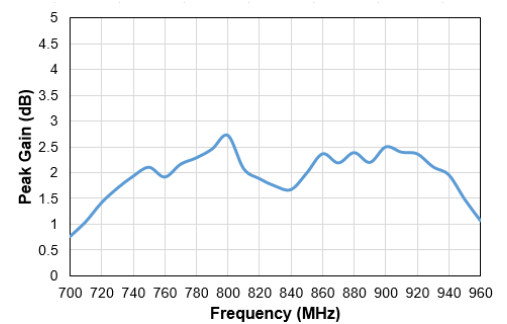
Low Band VSWR



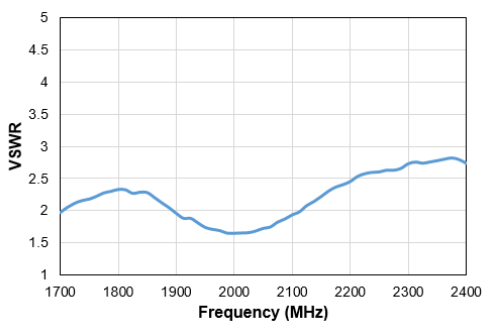
Low Band Efficiency



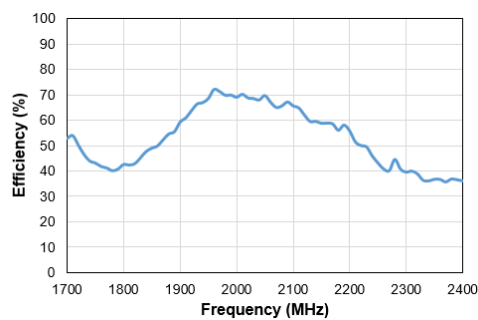
Low Band Peak Gain



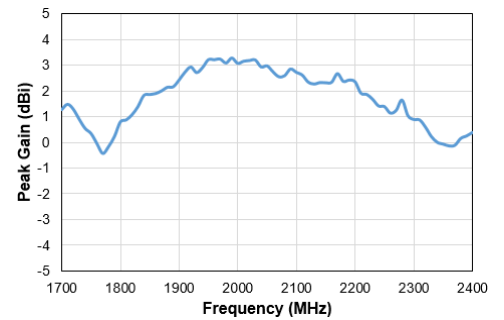
High Band VSWR



High Band Efficiency



High Band Peak Gain

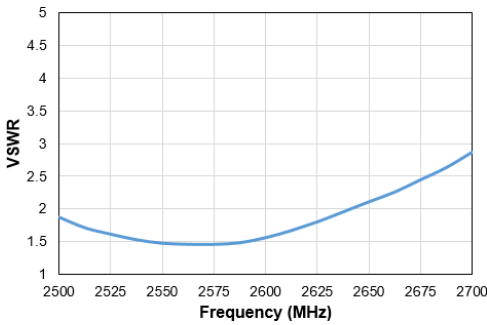


LTE / GPS / BT / Wi-Fi Antenna Evaluation Board Specifications.
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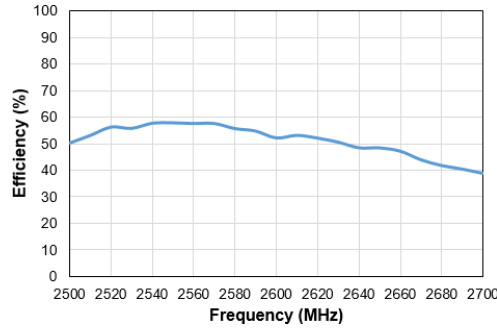
VSWR, Efficiency, Peak Gain Plots Cont., LTE (1004795)

Typical characteristics in free-space

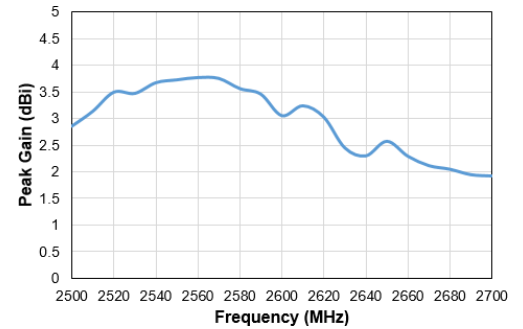
High-High Band VSWR



High-High Band Efficiency



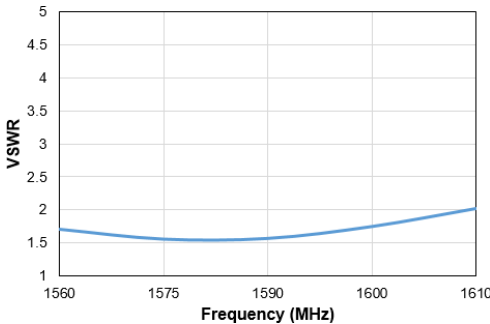
High-High Band Peak Gain



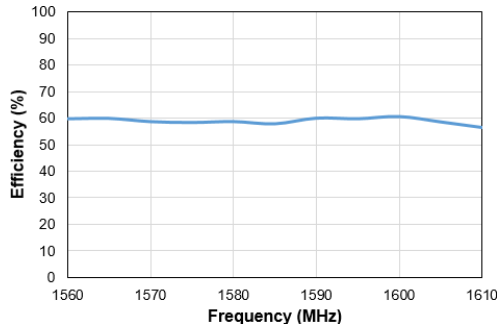
VSWR, Efficiency, Peak Gain Plots, GPS (1002427)

Typical characteristics in free-space

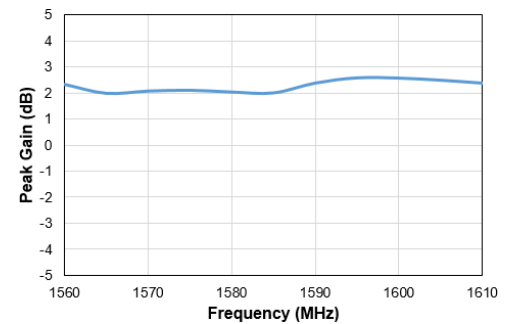
VSWR



Efficiency



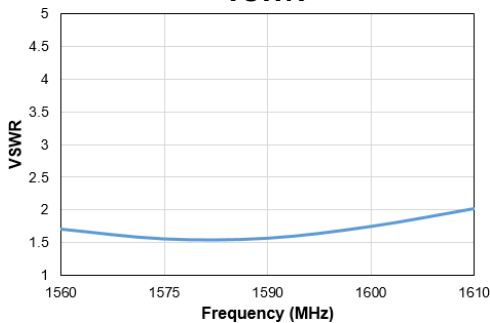
Peak Gain



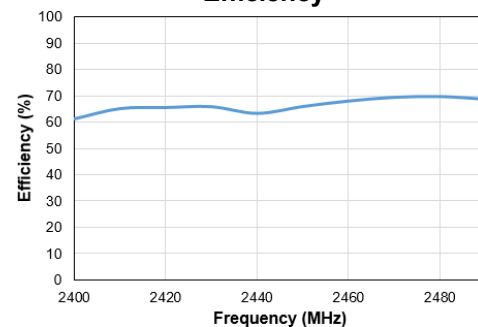
VSWR, Efficiency, Peak Gain Plots, BT (1001013)

Typical characteristics in free-space

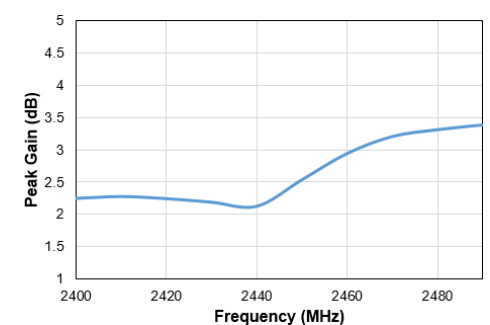
VSWR



Efficiency



Peak Gain

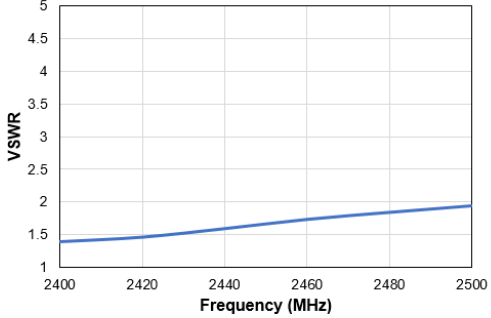


LTE / GPS / BT / Wi-Fi Antenna Evaluation Board Specifications.
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

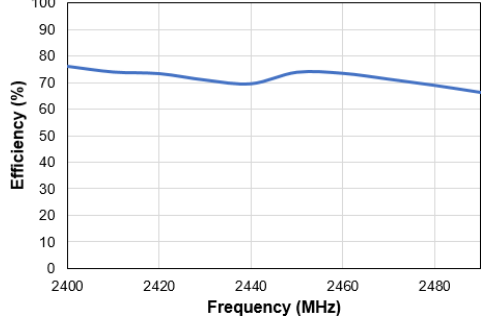
VSWR, Efficiency Peak Gain Plots, Wi-Fi (1000146)

Typical characteristics in free-space

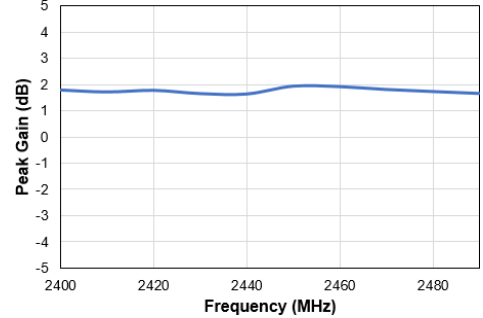
2.4 GHz Band VSWR



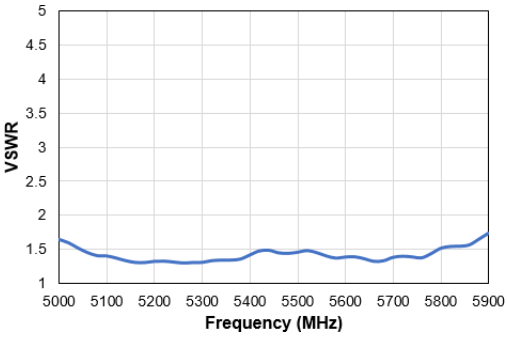
2.4 GHz Band Efficiency



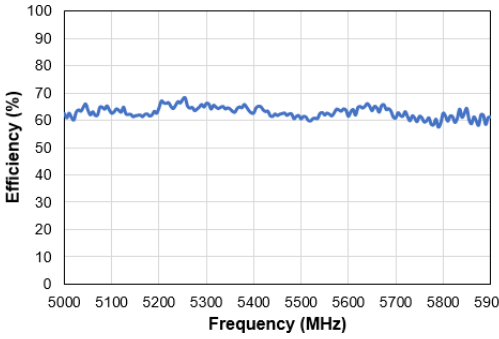
2.4 GHz Band Peak Gain



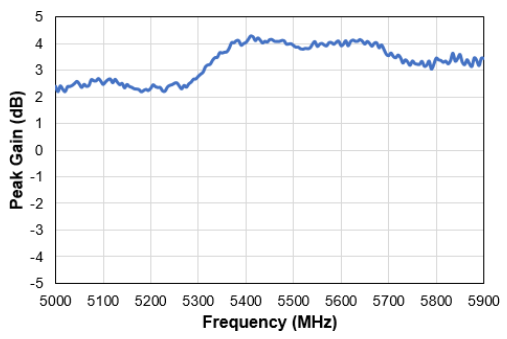
5 GHz Band VSWR



5 GHz Band Efficiency

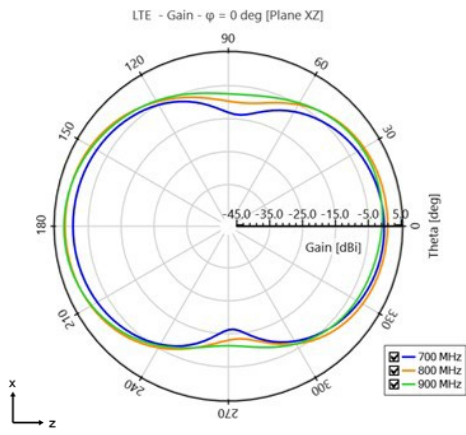
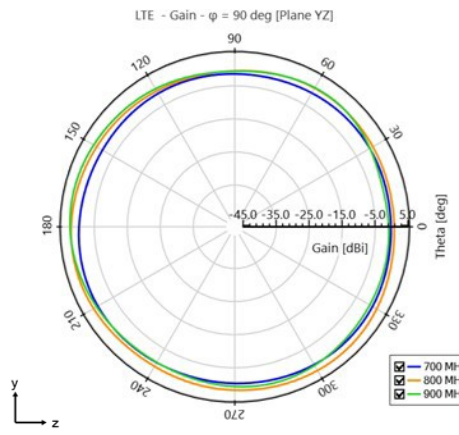
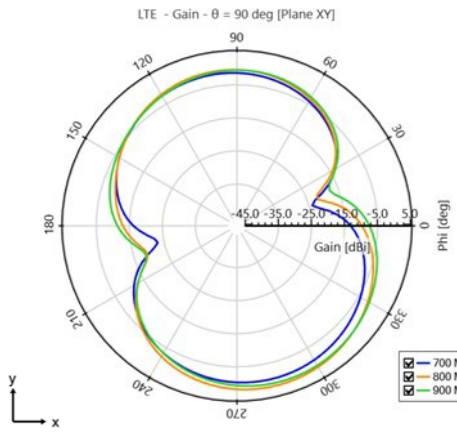


5 GHz Band Peak Gain



Antenna Radiation Patterns, LTE (1004795)

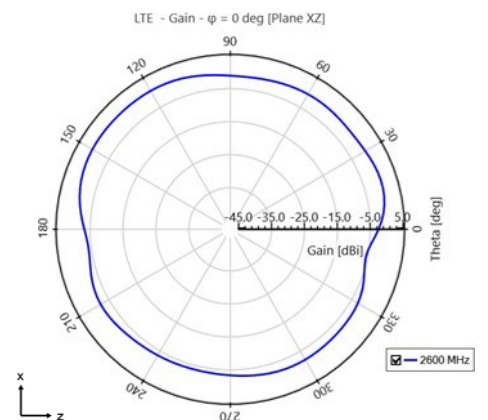
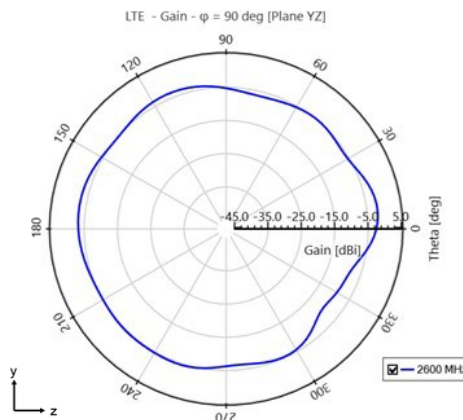
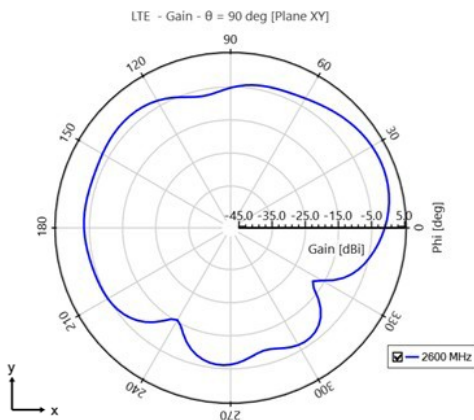
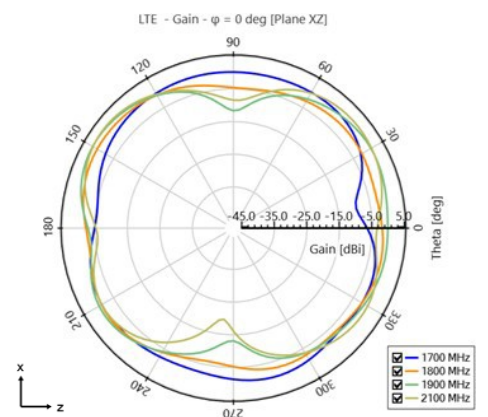
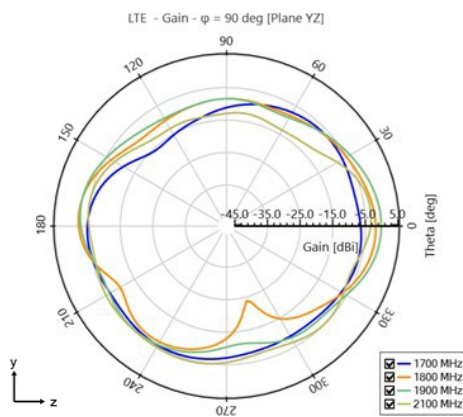
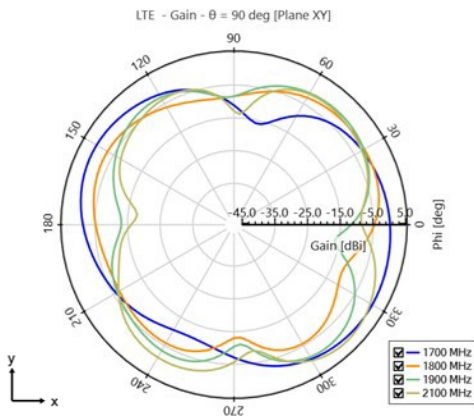
Measured @ 698-960 MHz, 1710-2400 MHz, 2500-2700 MHz



LTE / GPS / BT / Wi-Fi Antenna Evaluation Board Specifications.
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Antenna Radiation Patterns Cont., LTE (1004795)

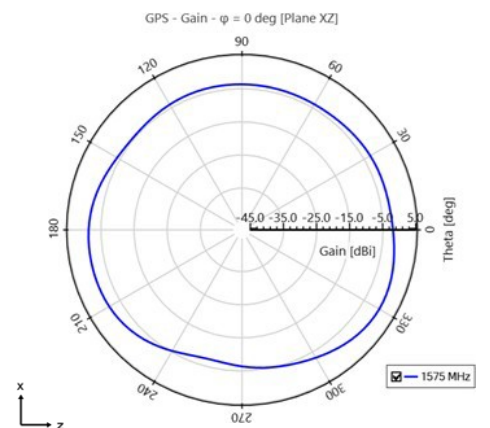
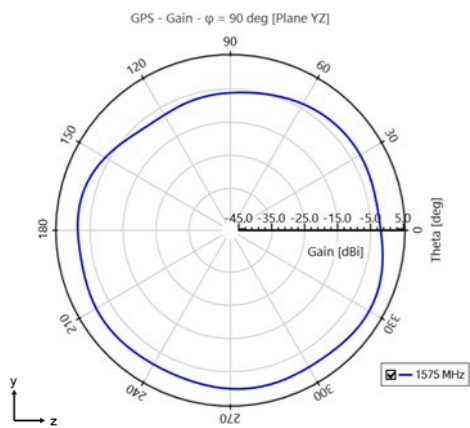
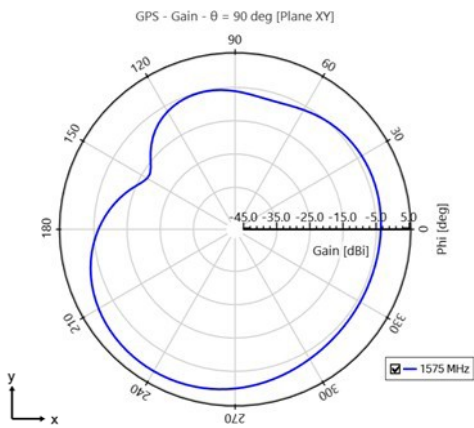
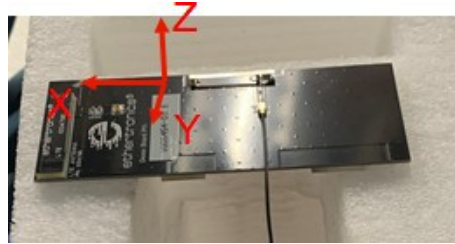
Measured @ 698-960 MHz, 1710-2400 MHz, 2500-2700 MHz



LTE / GPS / BT / Wi-Fi Antenna Evaluation Board Specifications.
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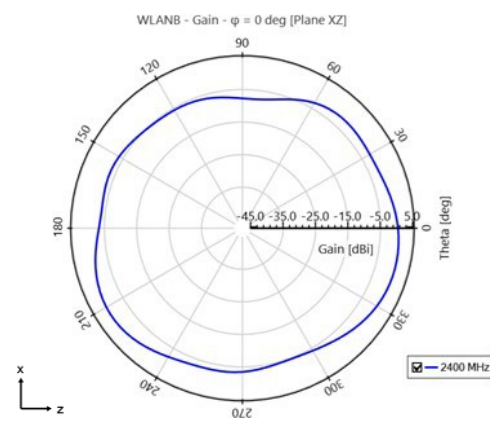
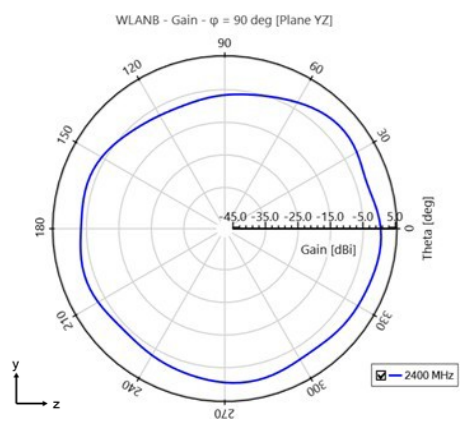
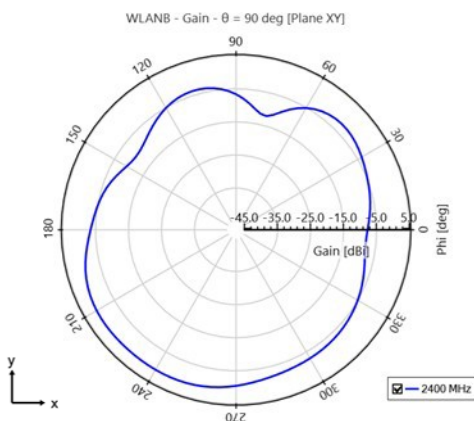
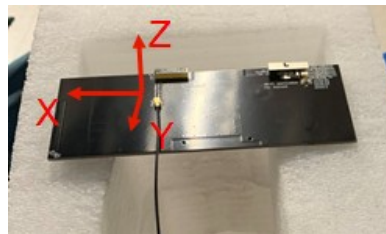
Antenna Radiation Patterns, GPS (1002427)

Measured @ 1575 MHz



Antenna Radiation Patterns, BT (1001013)

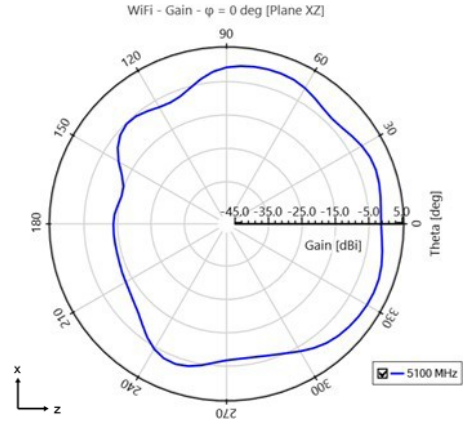
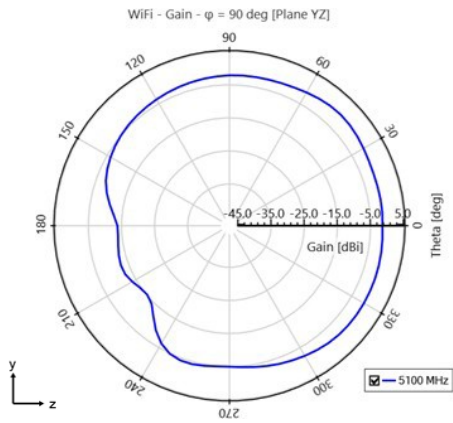
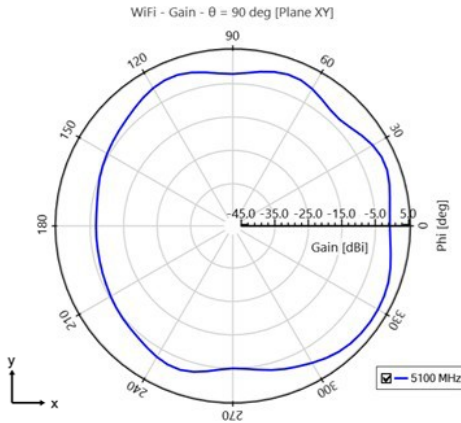
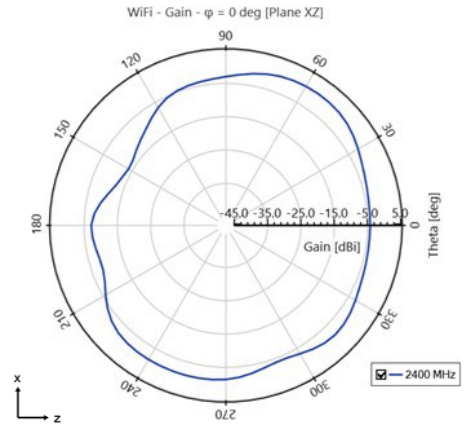
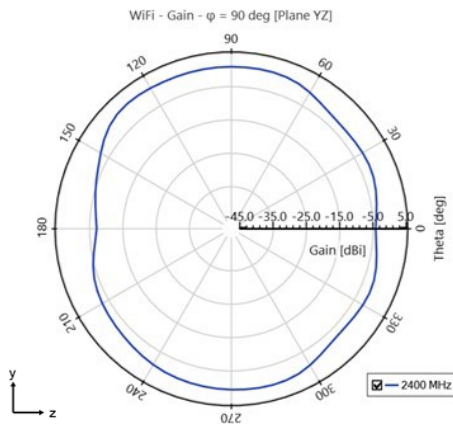
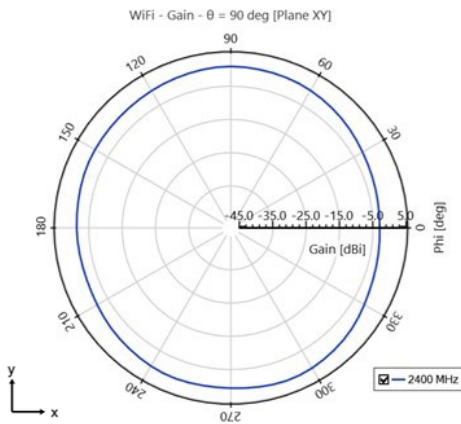
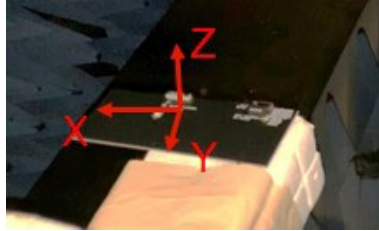
Measured @ 2400 MHz



LTE / GPS / BT / Wi-Fi Antenna Evaluation Board Specifications.
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Antenna Radiation Patterns, Wi-Fi (1000146)

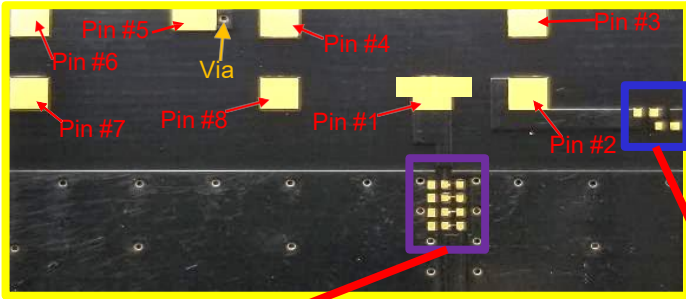
Measured @ 2400 MHz, 5100 MHz



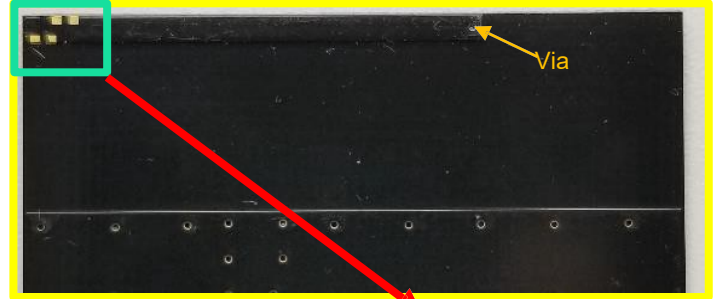
LTE / GPS / BT / Wi-Fi Antenna Evaluation Board Specifications.
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Antenna Matching Structure, LTE (1004795)

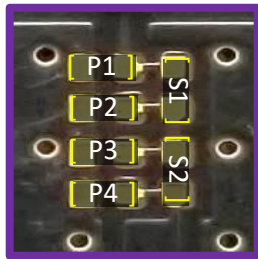
Demo Board Front View



Demo Board Back View

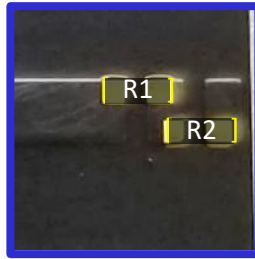


Antenna Matching

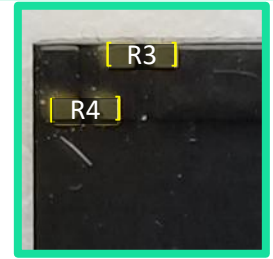


(Antenna Matching): pads are directly inline with the antenna feed trace.

2500-2700 MHz Tuning

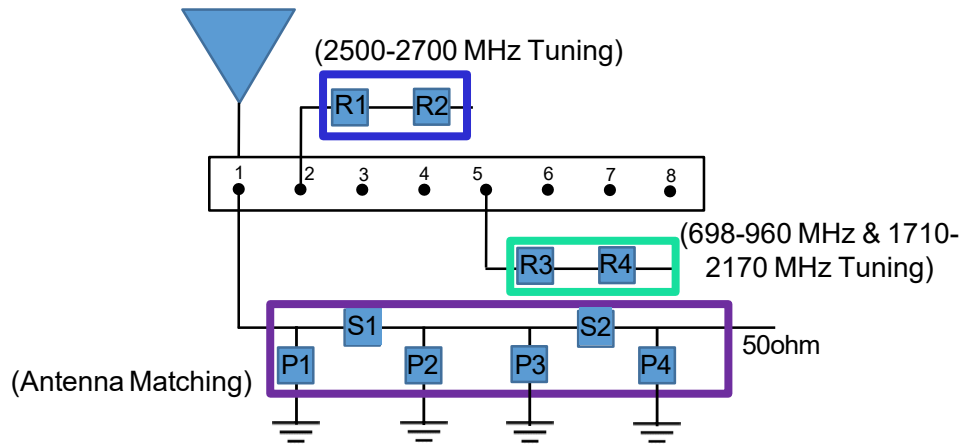


698-960 MHz & 1710-2170 MHz Tuning



Pin Descriptions

Pin#	Description
1	Feed
2	Antenna Tuning
3	Dummy Pad
4	Dummy Pad
5	Antenna Tuning
6	Dummy Pad
7	Dummy Pad
8	Dummy Pad

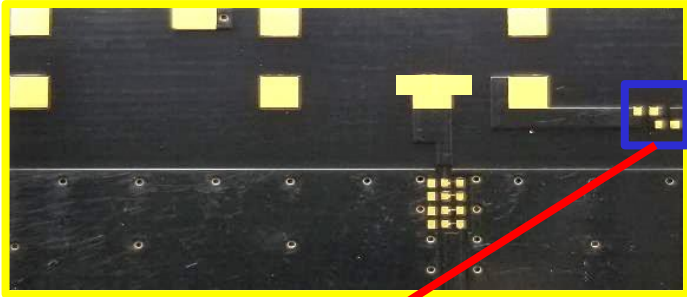


	P1	S1	P2	P3	S2	P4	R1	R2	R3-R4
Default Matching	8.2nH	4.7pF	0.3pF	DNI	0 Ohm	0.5pF	0 Ohm	DNI	0 Ohm
Tolerance	± 0.1nH	± 0.05pF	± 0.05pF	N/A		± 0.05pF		N/A	

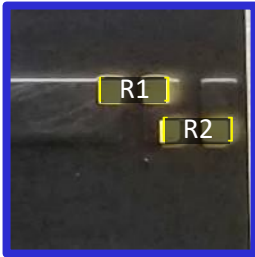
LTE / GPS / BT / Wi-Fi Antenna Evaluation Board Specifications.
KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

Antenna Tuning Options, LTE (1004795)

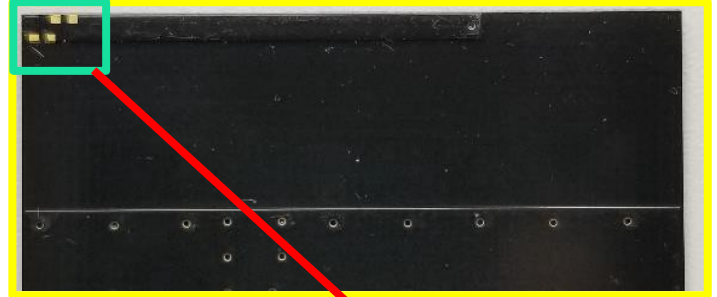
Demo Board Front View



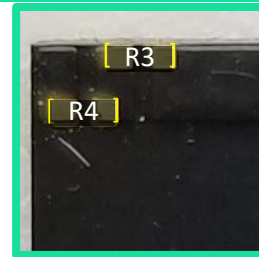
2500-2700 MHz Tuning



Demo Board Back View



698-960 MHz
& 1710-2170 MHz Tuning



Options for Tuning: "698-960 MHz & 1710-2170 MHz"

MODE	T1	T2		T3	
PADS	Connect: R3 & R4	Remove: R4		Remove: R4 & R3	
Outcome: (Ref: Baseline)	BASELINE	(698-960 MHz) ~20 MHz shift high	(1710-2170 MHz) ~20 MHz shift high	(698-960 MHz) ~30 MHz shift high	(1710-2170 MHz) ~35 MHz shift high

*R= 0 Ohm

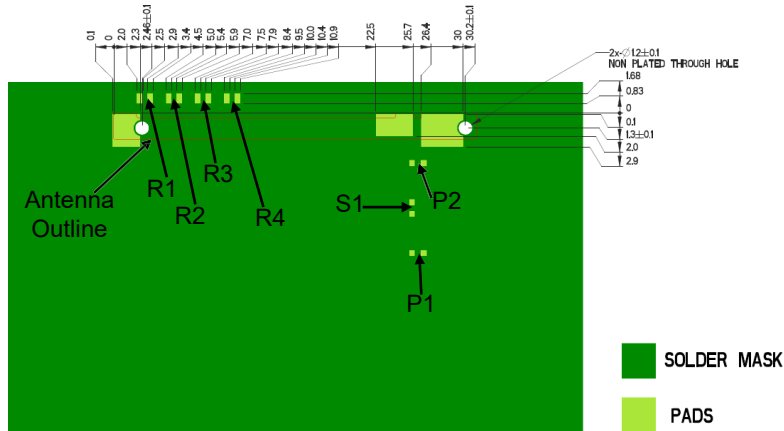
Options for Tuning: "2500-2700 MHz"

MODE	I4	I5	I6
PADS	Connect: R1	Connect: R1 & R2	Remove: R1 & R2
Outcome: (Ref: Baseline)	BASELINE	~60 MHz shift low	~70 MHz shift high

*R= 0 Ohm

LTE / GPS / BT / Wi-Fi Antenna Evaluation Board Specifications.
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Antenna Matching Options, GPS (1002427)



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

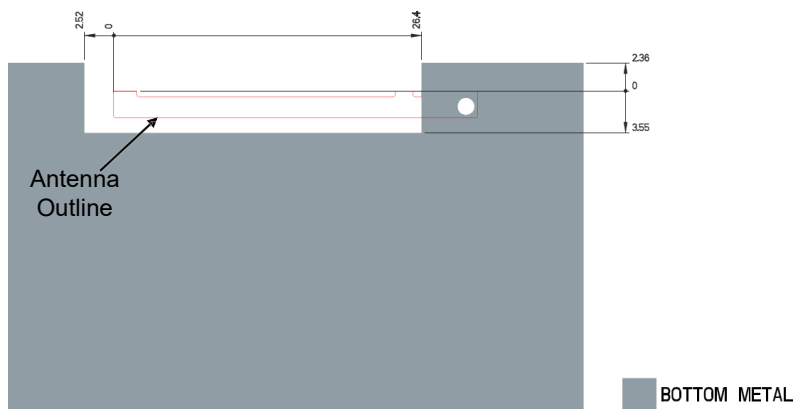
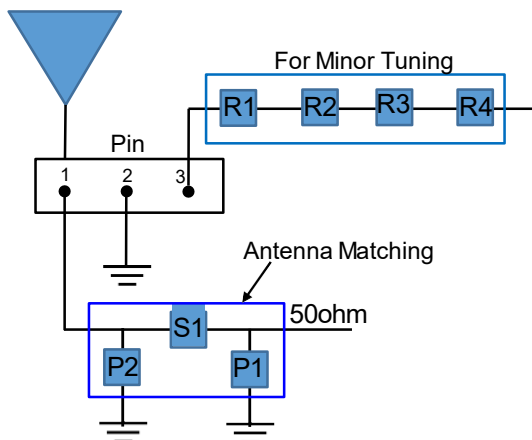
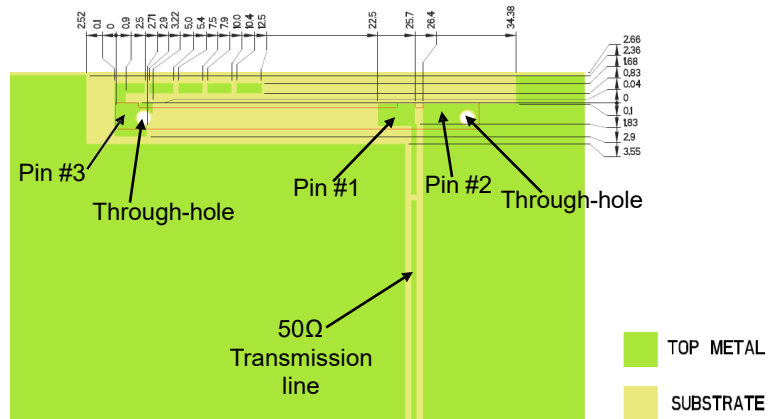
Pin Descriptions

Pin#	Description
1	Feed
2	Ground
3	Dummy Pad

Matching & Tuning Component Values

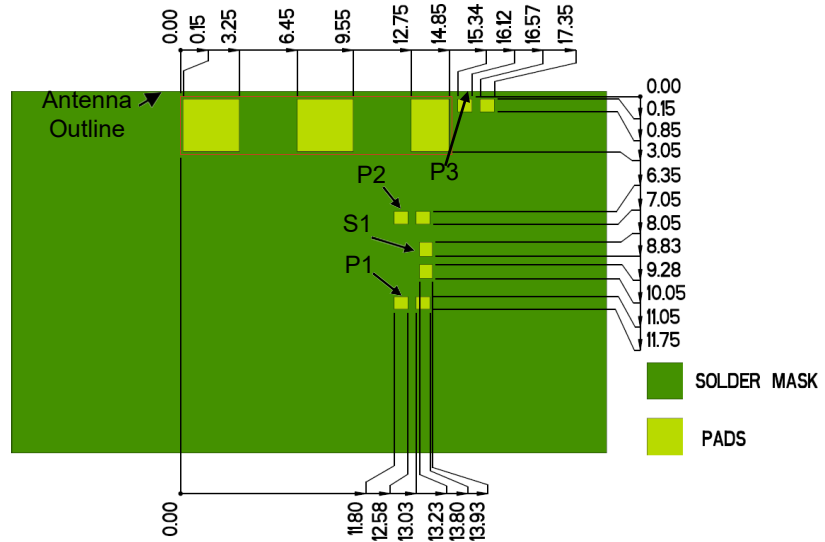
Component	Value	Tolerance
P1	DNI	N/A
S1	2 nH	±0.1nH
P2	3.6pF	±0.05pF
R1 - R4	DNI	N/A

*Actual matching values depend on customer design



LTE / GPS / BT / Wi-Fi Antenna Evaluation Board Specifications.
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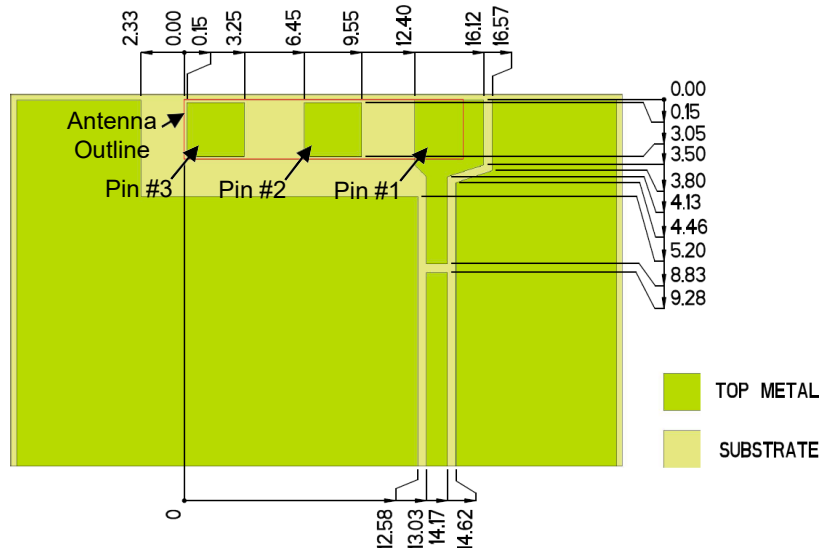
Antenna Matching Options, BT (1001013)



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

Pin Descriptions

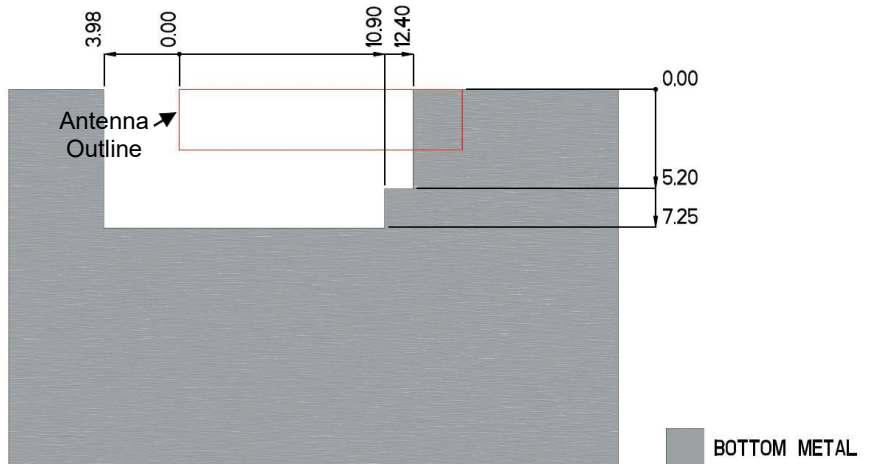
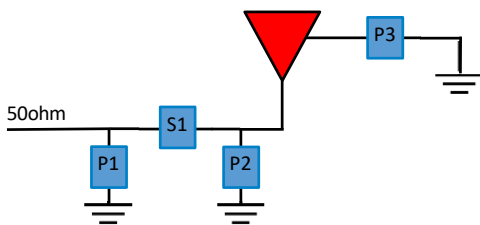
Pin#	Description
1	Feed
2	Dummy Pad
3	Dummy Pad



Matching Pi Network (Demo Board)

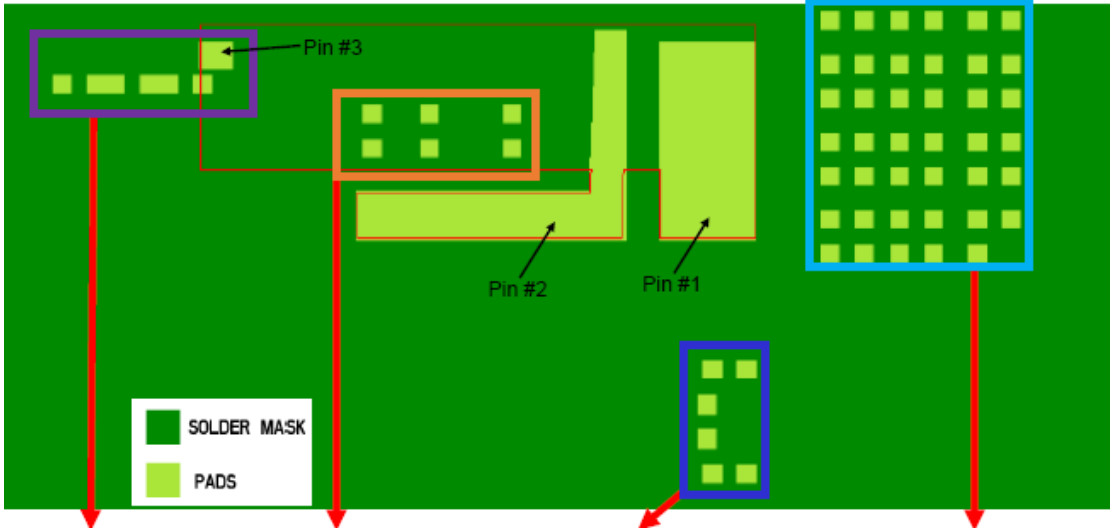
Component	Value	Tolerance
P1	DNI	N/A
S1	1nH	±0.1nH
P2	N/A	N/A
P3	0Ω	N/A

*Actual matching values depend on customer design



LTE / GPS / BT / Wi-Fi Antenna Evaluation Board Specifications.
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Antenna Matching Options, Wi-Fi (1000146)

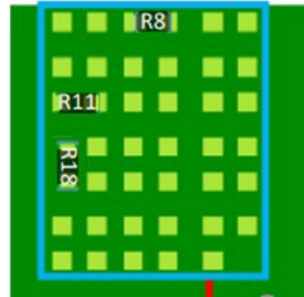
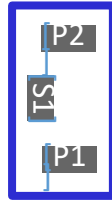


Low Band Tuning
(Add to Shift Low)

Low Band Tuning
(Add to Shift High)

Antenna Matching

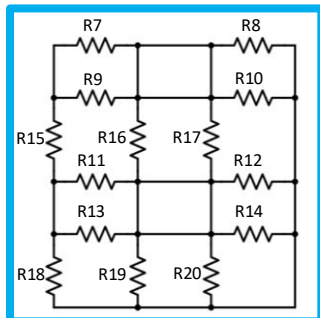
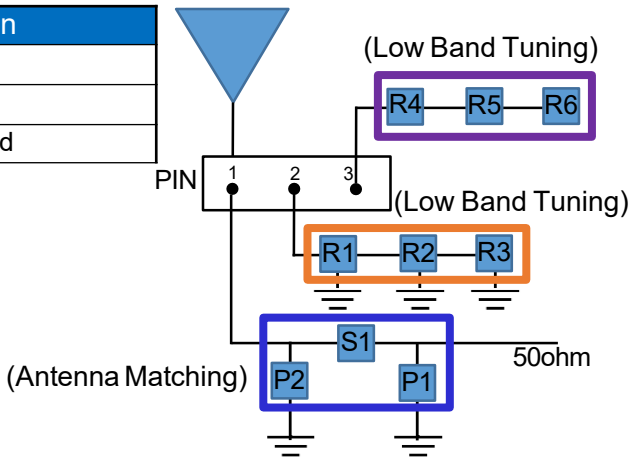
High Band Tuning
(Add to Shift High, DNI to Shift Low)



R8=R11=R18=0Ohm

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.

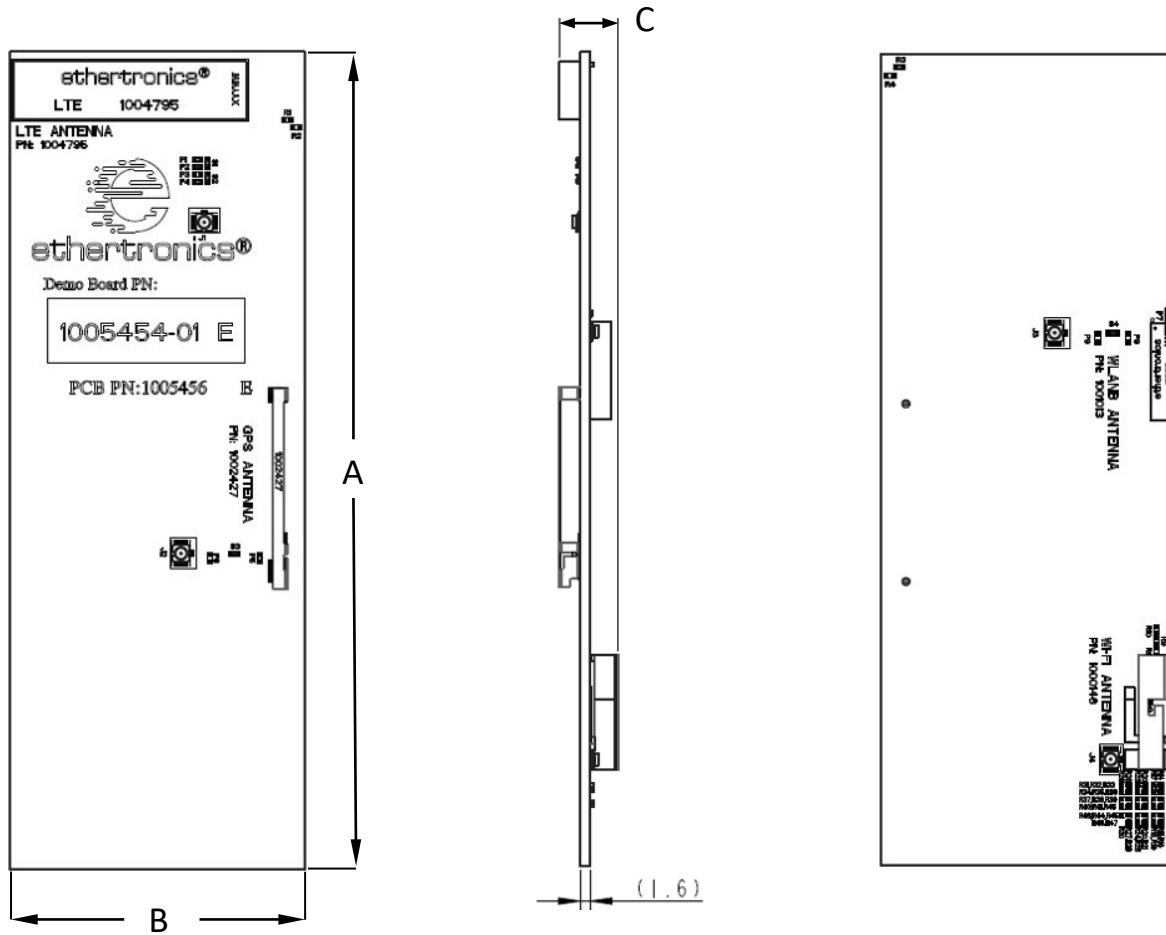
	P1	S1	P2	R1 – R3	R4 – R6	R7 – R14	R15 - R20
Default Values	DNI	0Ω	DNI	DNI	DNI	DNI	DNI
Tolerance	N/A	N/A	N/A	N/A	N/A	N/A	N/A

LTE / GPS / BT / Wi-Fi Antenna Evaluation Board Specifications.
 KYOCERA AVX produces a wide variety of standard and custom antennas to meet user needs.

Mechanical Dimensions

Typical antenna dimensions (mm)

Part Number	Description	A (mm)	B (mm)	C (mm)
1005454-01	LTE / GPS / BT/ Wi-Fi Antenna Evaluation Board	126.5	45.5	9.07



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