Ceramic Chip Antenna 1575MHz & 2450MHz

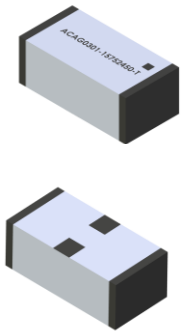
ACAG0301-15752450-T

Request Samples | Check Inventory

3.2 x 1.6 x 1.2 mm
RoHS/RoHS II Compliant
MSL Level = 1

Description

This miniature GNSS + Wi-Fi combination chip antenna delivers optimized performance in an ultra-compact 3.2 x 1.6 x 1.2 mm SMD package. Featuring a low VSWR of ≤2.0, 4.18 dBi peak gain, and 57% total efficiency, it provides robust dual-band connectivity for asset tracking, fleet management, and smart grid applications. The PCB edge-mount design enables seamless integration into space-constrained devices. This RoHS-compliant, MSL Level 1 antenna is engineered for industrial IoT systems including traffic monitoring, energy storage, video surveillance, and data networks where reliable wireless performance and minimal footprint are critical requirements.



Features

- Miniature Factor: 3.2 x 1.6 x 1.2 mm
- Low Return Loss of: ≤ -6 dB
- Peak Gain: 1.21 / 3.18 dBi @1575 / 2450 MHz
- Total Efficiency: 57% / 73% @1575 / 2450 MHz
- Linear Polarization
- Surface Mount (SMD)
- Integration: PCB Edge Mounting
- RoHS Compliant | MSL Level 1

Applications

- Asset Tracking & Fleet Management
- Traffic Control and Monitoring
- Energy Generation and Storage System
- Data Network Center
- Video Surveillance System
- Smart Grid System

Ordering Information

Part Number	Description
ACAG0301-15752450-T	Ceramic Chip Antenna 1575MHz & 2450MHz on Tape & Reel

Note: Other options not listed may be available upon request via Abracon online support

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RoHS/RoHS II Compliant
MSL Level = 1

Electrical Specification

Parameter	Specification		Unit
Operating Frequency	1575	2450	MHz
Return Loss (Typ.)	< -10		dB
Peak Gain	1.21	3.18	dBi
Average Gain	-1.13	-1.19	dBi
Maximum Total Efficiency	57	73	%
Polarization	Linear		-
Impedance	50		Ω
Radiation Pattern	Omni-directional		-
Input Power	≤ 2.0		W

Note: All measurements were conducted on the evaluation board in free space. Performance will vary depending on the ground plane, application, and environment.

Mechanical Specification

Parameter	Specification
Antenna Dimension	3.2 x 1.6 x 1.2 mm
Evaluation Board Dimension	90 x 50 mm
Mounting Type	Surface Mount
Mounting Location	PCB Center Mounting
Material(s)	Ceramic
Additional Resources	Download STEP File, Package Drawing, 3D PDF

Environmental Specification

Parameters	Specifications
Operating Temperature	-40ºC ~ +85ºC
Storage Temperature	-40ºC ~ +85ºC
Humidity	55% - 75% R.H.
MSL level	1
RoHS Compliant	Yes

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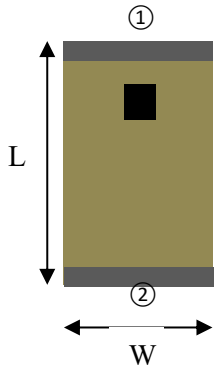
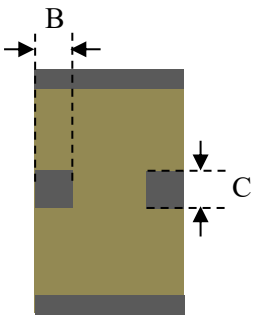
Product Dimensions



(Top View)

(Side View)



(Bottom View)

Number	Terminal Name	Number	Terminal Name
①	INPUT-GPS	③	GND
②	INPUT-2.4GHz	④	GND

Symbols	L	W	T	A	B	C
Dimensions	3.2+/-0.2	1.6+/-0.2	1.2+/-0.15	0.2+/-0.15	0.5+/-0.15	0.47+/-0.15

Unit: mm

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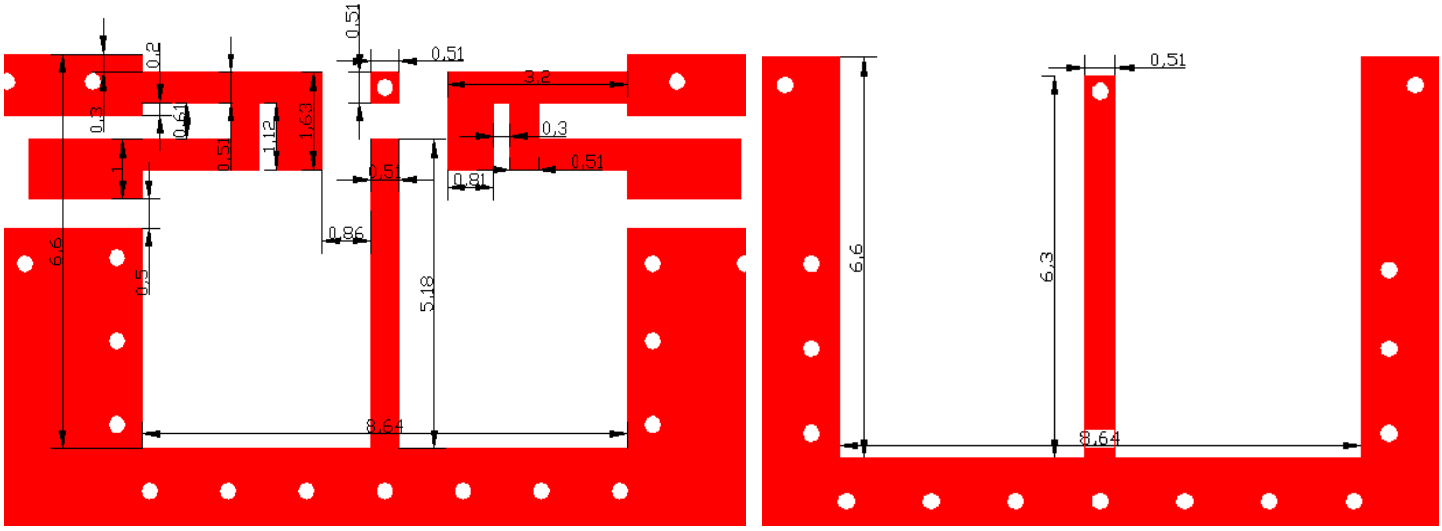
MSL Level = 1

Recommended PCB layout

If there are several layers in the PCB, there is an advantage to add vias for smooth interconnection of the ground areas to avoid splits in the ground plane. It is also important that ground clearance is respected through all layers of the PCB. It is recommended to implement a matching network to optimize the antenna impedance in your application.



Top Bottom

Unit: mm

Transmission Line

The transmission line should be kept as short as possible and be designed to have a characteristic impedance of 50Ω. Abracon recommends using a Co-Planar Waveguide with Ground (CPWG), which dimensions can be derived by any trusted calculator, using the correct input for PCB materials and layer stack-up.

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Request Samples | Check Inventory

3.2 x 1.6 x 1.2 mm
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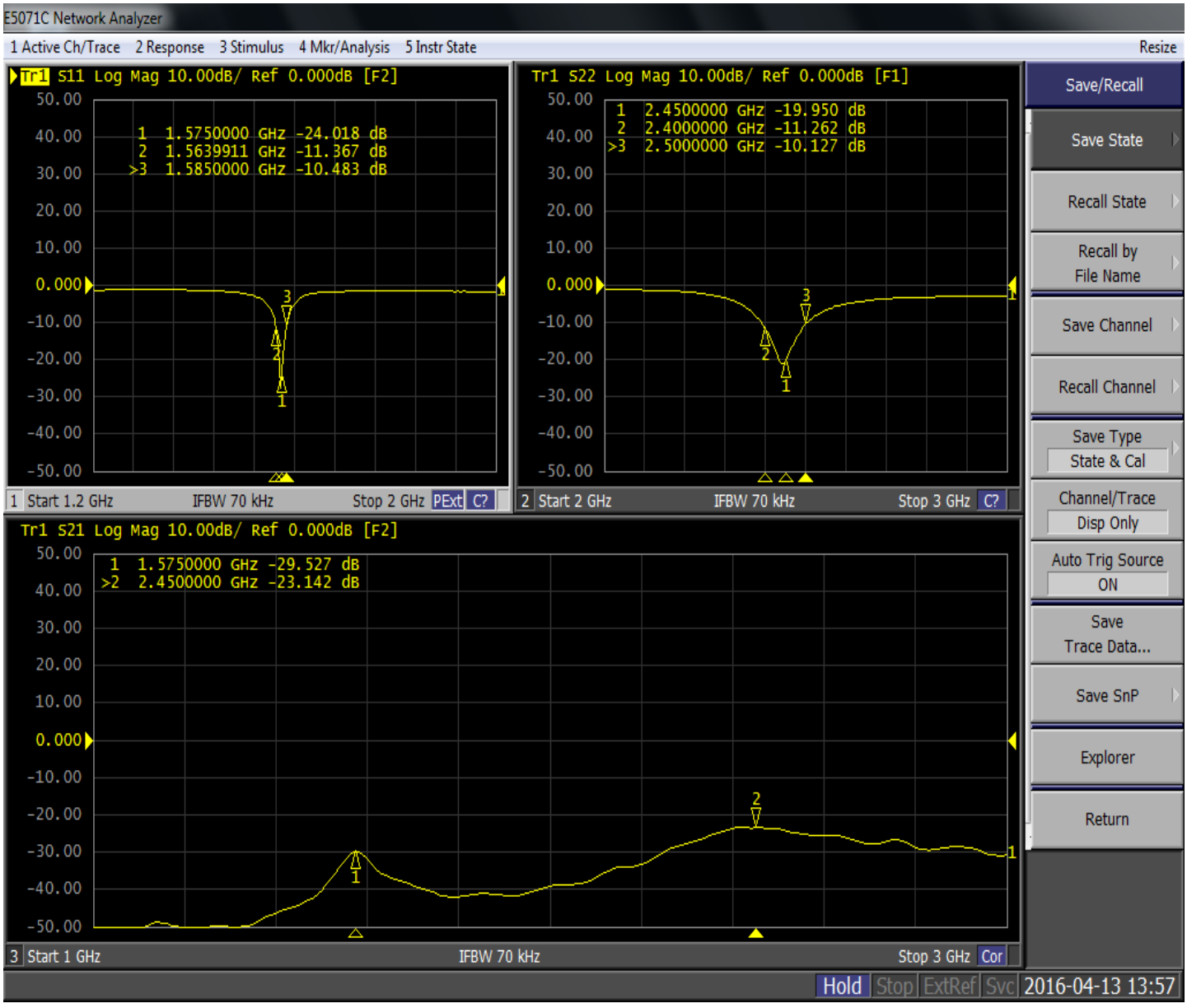
Reflection Characteristics –Return Loss



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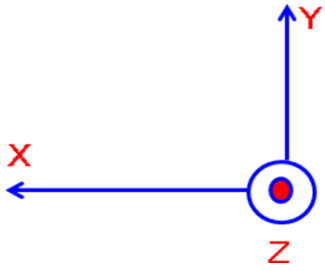
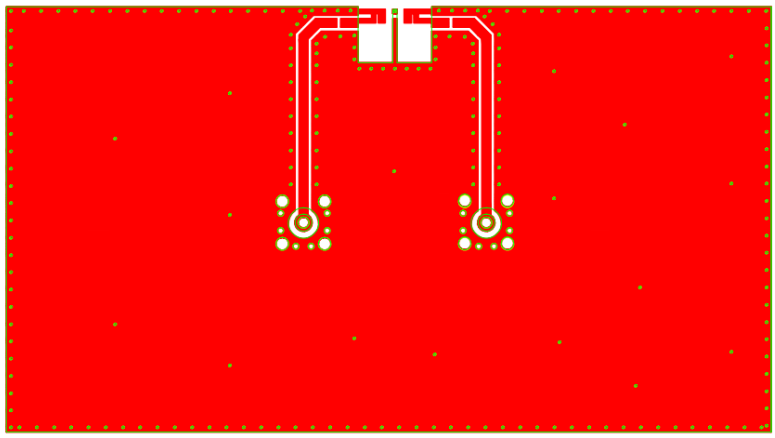
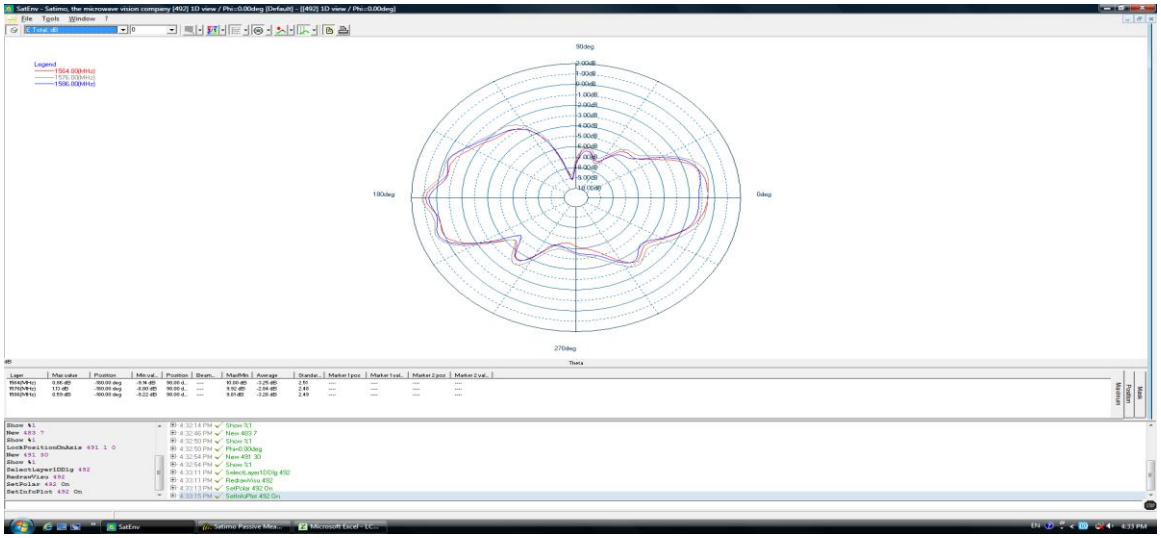
Radiation Characteristics – 3D & 2D pattern





GPS

X-Z Plane



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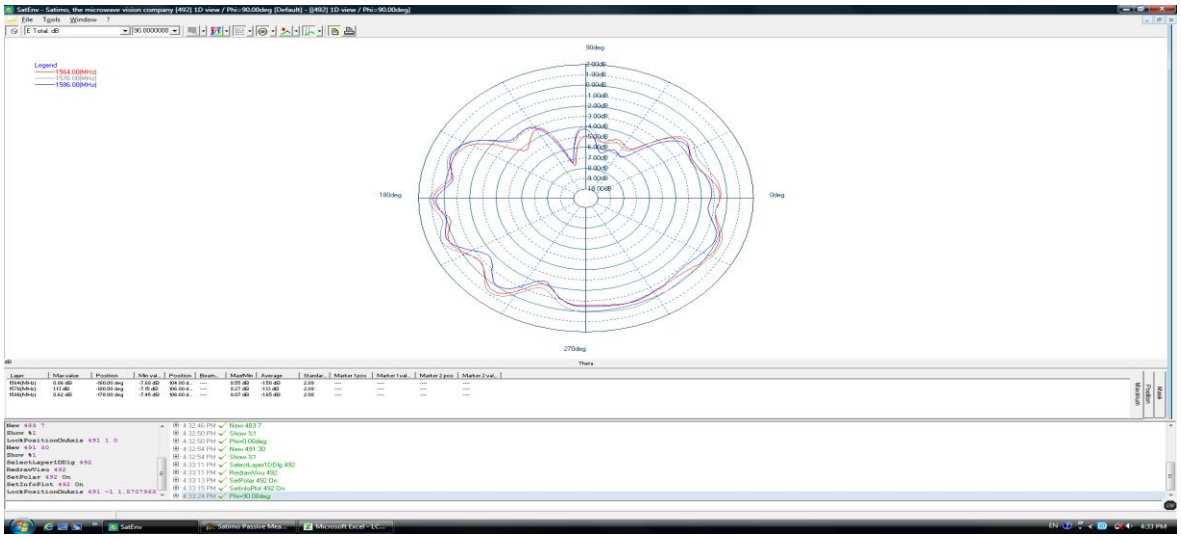
Request Samples

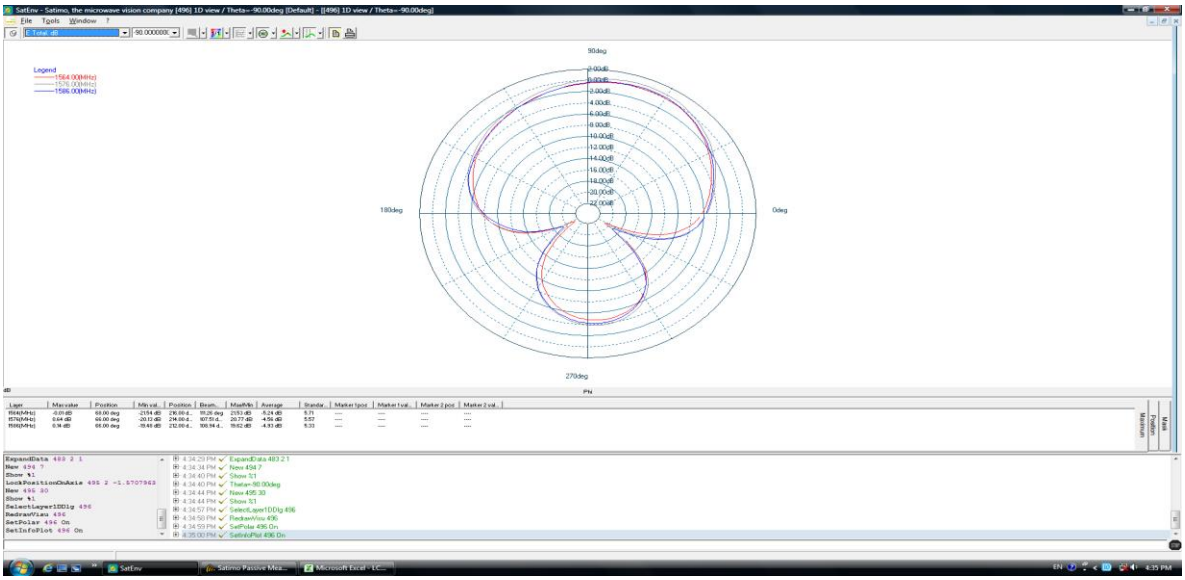
Check Inventory

3.2 x 1.6 x 1.2 mm
RoHS/RoHS II Compliant
MSL Level = 1

Y-Z Plane



X-Y Plane



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3.2 x 1.6 x 1.2 mm
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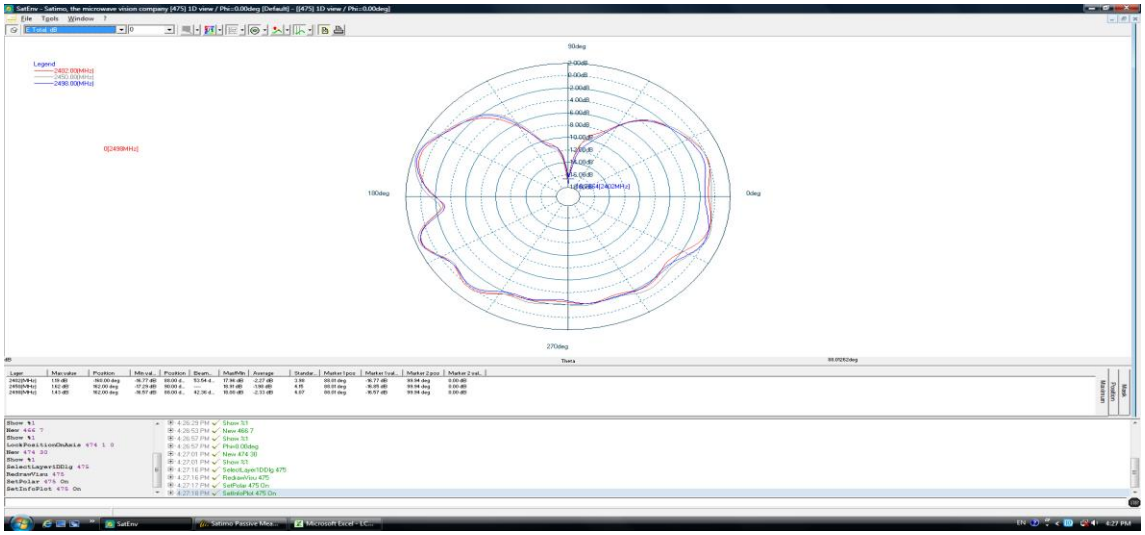
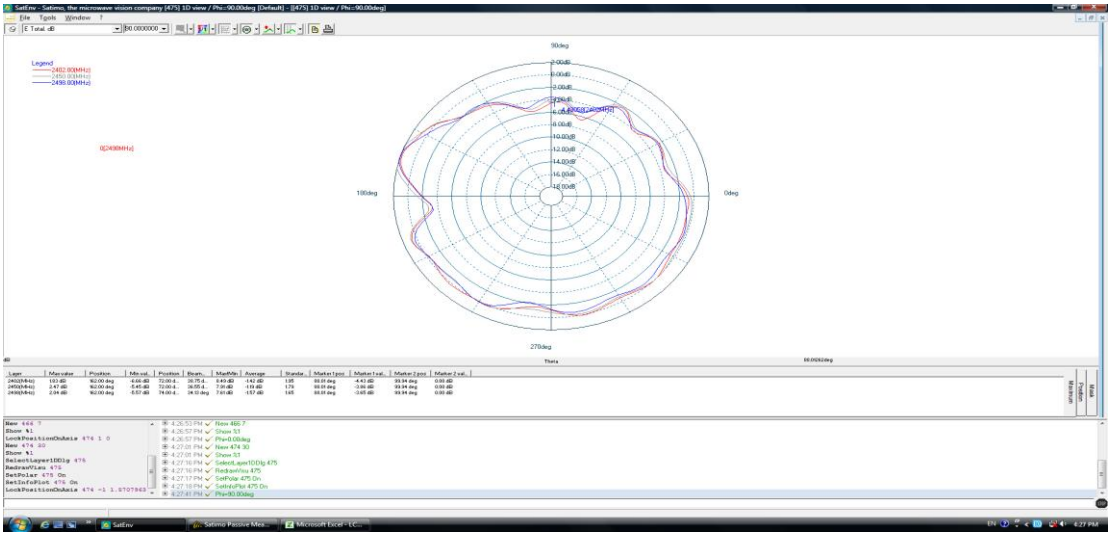
MSL Level = 1

2.45 G

X-Z Plane



Y-Z Plane



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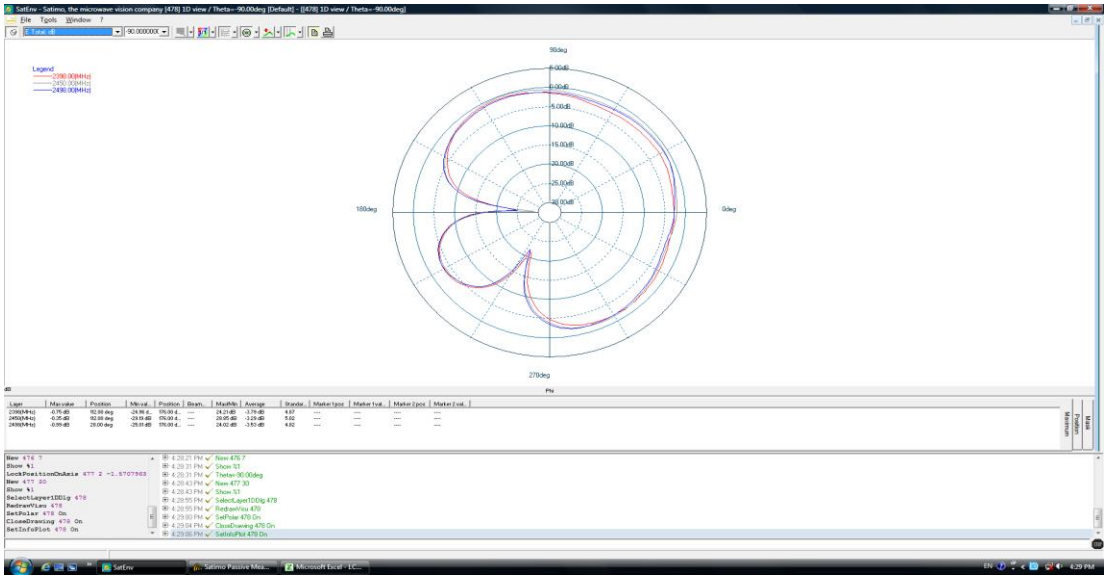
Check Inventory

3.2 x 1.6 x 1.2 mm
RoHS/RoHS II Compliant
MSL Level = 1

X-Y Plane



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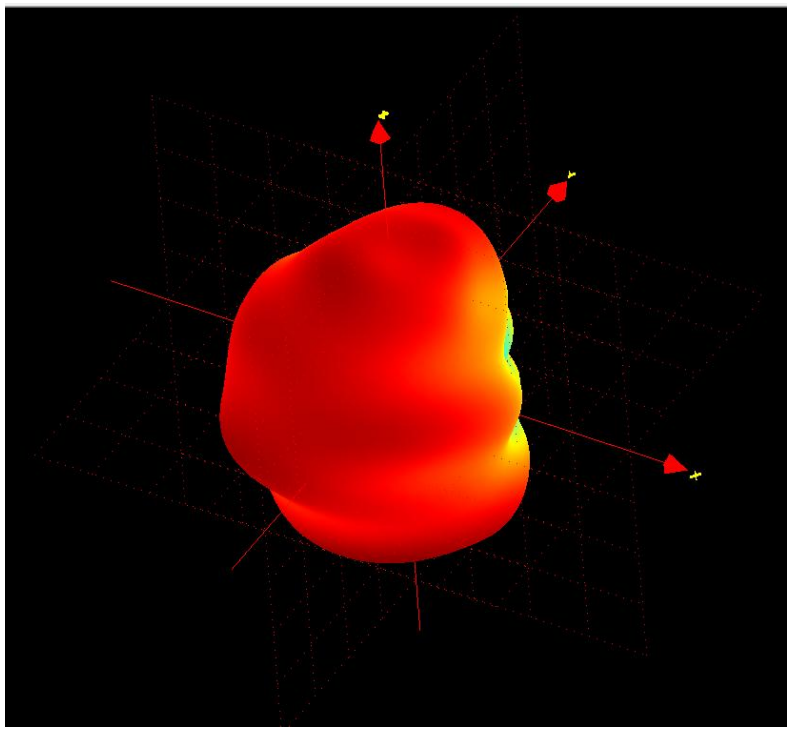
GPS



Frequency (MHz)	1565	1575	1585
Avg. Gain (dBi)	-1.5	-1.13	-1.65
Peak Gain (dBi)	1.05	1.21	1.13
Efficiency (%)	53	57	52

2.45 GHz

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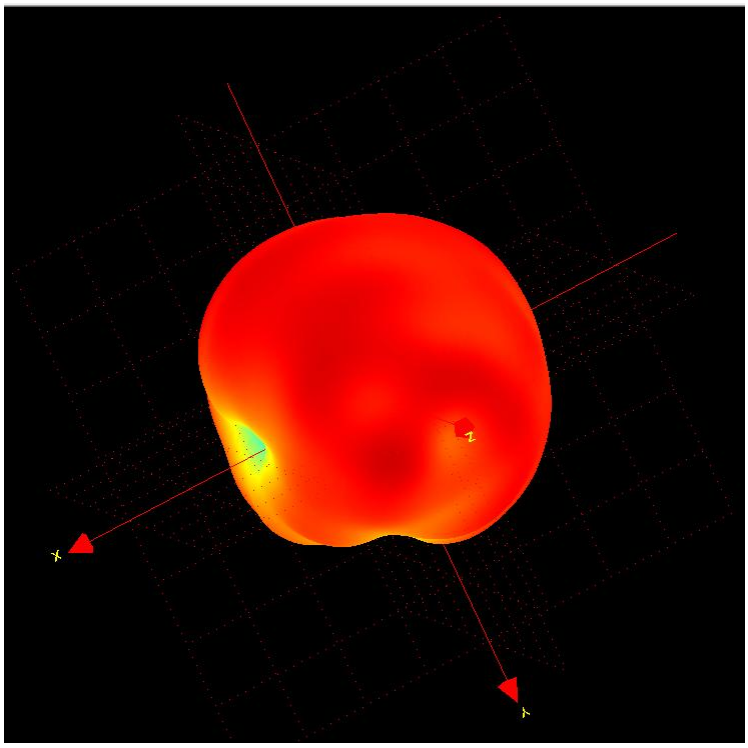

Frequency (MHz)	2400	2450	2500
Avg. Gain (dBi)	-1.42	-1.19	-1.57
Peak Gain (dBi)	2.87	3.18	2.96
Efficiency (%)	66	73	67

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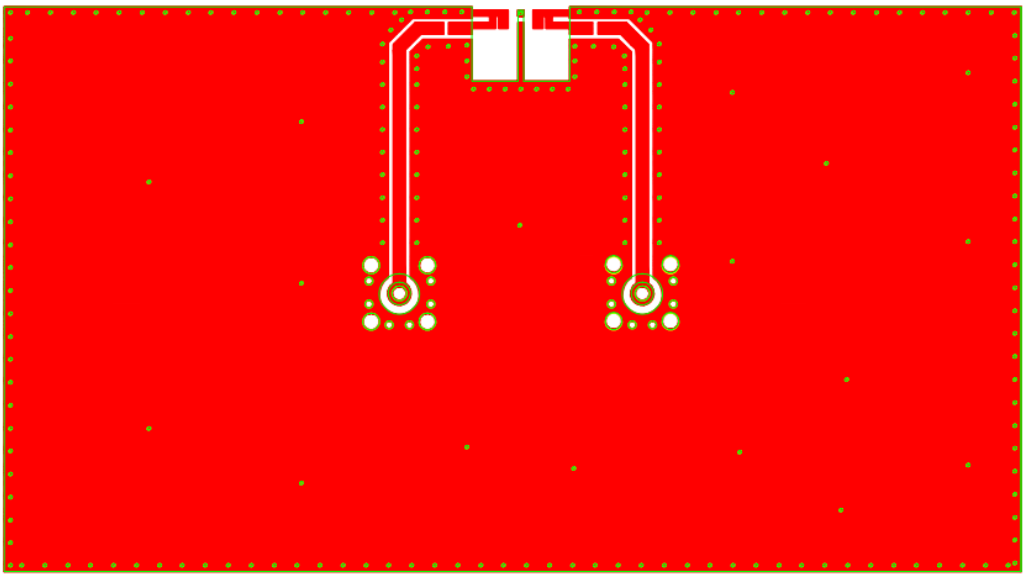
Evaluation Board Outline & Matching Circuit

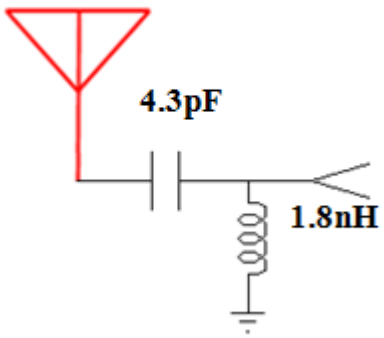
The evaluation board (Abracon ACAG0301-15752450-T-EVB) is developed to simplify antenna testing and evaluation. It has an arbitrary size of 90 x 50 mm and includes an SMA connector. The purpose is to give a reference design for an optimal antenna implementation. The evaluation board can also be used to test other implementations by cutting and soldering the PCB into any device.



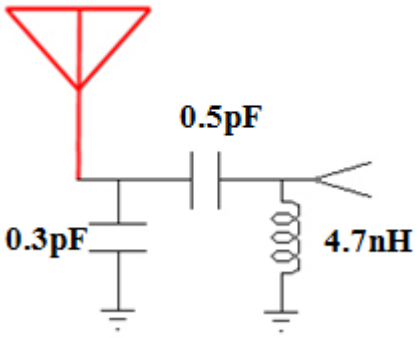
The evaluation board has a matching circuit implemented next to the antenna. This is aimed at enabling optimization possibilities for the user. The component positions are sized for 0402 (1005 metric) SMD components.

The antenna requires a matching circuit to fine-tune the resonant frequency and achieve optimal balance. The evaluation board is pre-tuned for optimal performance in the 2.4–2.5 GHz range using the components listed below (equivalents may be used):

GPS



2.45G



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Reflow Profile [JEDEC J-STD-020]

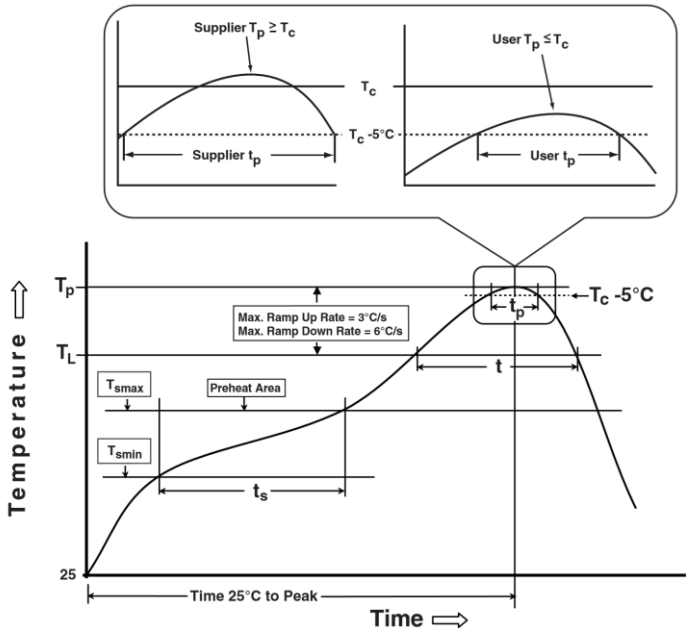

Table 1

SnPb Eutectic Process Classification Temperatures (T_c)		
Package Thickness	**Volume mm³ <350**	**Volume mm³ ≧350**
<2.5mm	235°C	220°C
≧2.5mm	220°C	220°C

Table 2

Pb-Free Process Classification Temperatures (T_c)			
Package Thickness	**Volume mm³ <350**	**Volume mm³ 350-2000**	**Volume mm³ >2000**
<1.6mm	265°C	265°C	265°C
1.6mm - 2.5mm	260°C	250°C	245°C
>2.5mm	250°C	245°C	245°C

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat / soak		
Temperature minimum (T_{smin})	100°C	150°C
Temperature maximum (T_{smax})	150°C	180°C
Time (T_{smin} to T_{smax}) (t_s)	60 – 120 sec.	60 – 120 sec.
Average ramp-up rate (T_{smax} to T_p)	3°C/sec. max	3°C/sec. max
Liquidous temperature (T_L)	183°C	220°C
Time at Liquidous (T_L)	60 – 150 sec.	30 – 40 sec.
Peak package body temperature (T_p)*	**See Table 1**	**See Table 2**
Time (T_p)** within 5°C of the specified classification temperature (T_c)	20 sec.	5 sec.
Ramp-down rate (T_p to T_{smax})	6°C/sec. max	3°C/sec. max
Time 25°C to peak temperature	6 min. max	8 min. max
Reflow cycles	2 max	2 max

*Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and a user maximum.
**Tolerance for time at peak profile temperature (t_p) is defined as a supplier minimum and a user maximum.

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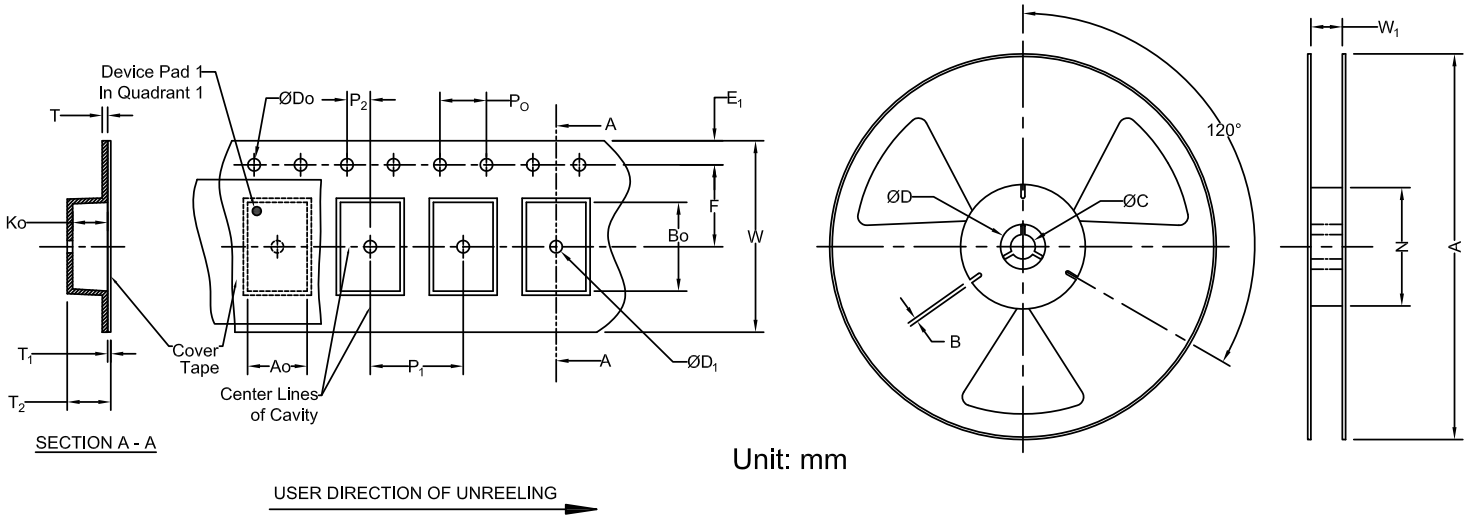
Packaging

Reel (3000 pcs/Reel)

Size of the carton: 404 x 206 x 250 mm

Tape & Reel Dimension



Unit: mm

Carrier Tape Specifications (mm)											
Do	K_0	E_1	P_0	P_2	T	F	P_1	W	A_0	B_0	Reel Qty
1.50 ± 0.1	1.3 ± 0.1	1.75 ± 0.1	4.0 ± 0.1	2.0 ± 0.10	0.22 ± 0.05	3.5 ± 0.10	4.0 ± 0.1	8.0 ± 0.10	2.0 ± 0.1	3.5 ± 0.1	3,000

Reel Specifications (mm)			
A	W_1	N	C
178 ± 2.0	8.5 ± 1.0	60	13 ± 0.5

Additional Resources

STEP File: ACAG0301-15752450-T STEP File

Package Drawing: ACAG0301-15752450-T Package Drawing

3D PDF: ACAG0301-15752450-T 3D PDF

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