

Johanson 2450AT42E010xx Antennas

Introduction

Johanson Technology's 2450AT42E010xx miniature RF ceramic chip antennas are used in 2.4GHz wireless applications such as Bluetooth, 802.11, ISM, Zigbee, etc. What's unique about this chip antenna is that it must have metal directly underneath on the bottom layer of the PCB it is mounted in order to function properly. The antenna was purposely designed for small coin cell, wearable, IoT and related short range applications where metal or a battery/display covers the entire length or side of the PCB or encasement under the antenna and there is no room for the usual /typical antenna metal clearance requirements. Since PCB thickness affects antenna performance two versions of the antenna are available to allow for optimum performance depending on PCB thickness.

How To Choose The Correct Antenna Variant

Johanson Technology offers variants of this antenna since the antenna's efficiency is largely affected by the thickness of the PCB's substrate. This allows a more robust design to fit your PCB. The disparity between antenna variations are internal only; variations are identical in dimension and solder footprint.

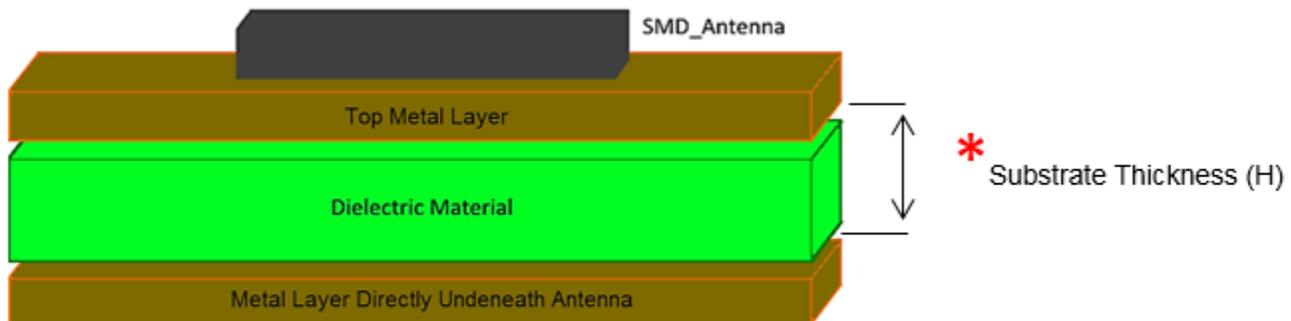
Typical Efficiency Values @ 2.44GHz for various scenarios for a 30x50mm PCB

The following efficiency values represent simulated performance on a 30x50mm EVB. note: that antenna efficiency varies widely with board layout, size and surroundings.

PCB Substrate Thickness (H)	2450AT42E0100	2450AT42E010B
H = 0.12 mm	1.95%	1.02%
H = 0.7 mm	29.20%	9.30%
H = 1.5 mm	23.30%	41.90%
H = 2.5 mm	21.60%	34.20%

Note: "H" substrate thickness of <0.25mm (10mil) is not recommended. The component will still work and radiate, just not optimally.

PCB Substrate Thickness (H)	Recommended Johanson Technology PN
1.0mm	2450AT42E0100
1.0mm - 2.0mm	2450AT42E010B

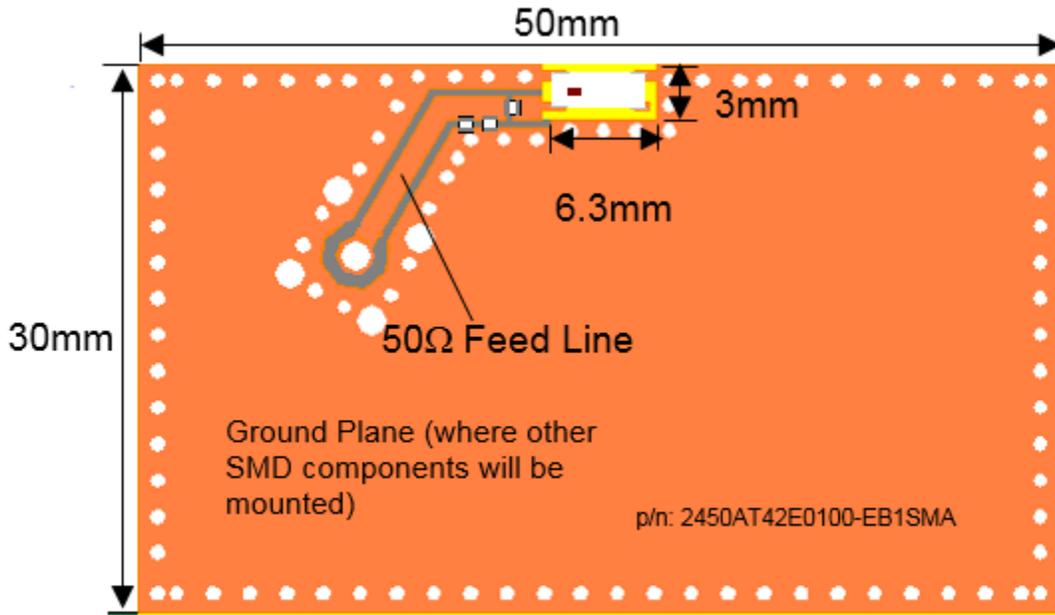


* For PCBs consisting of multiple layers, the thickness (H) is limited only to the metal layer immediately below 'Top Metal Layer.'

Availability

<https://www.digikey.com/product-detail/en/johanson-technology-inc/2450AT42E0100E/712-1589-1-ND/5980447>

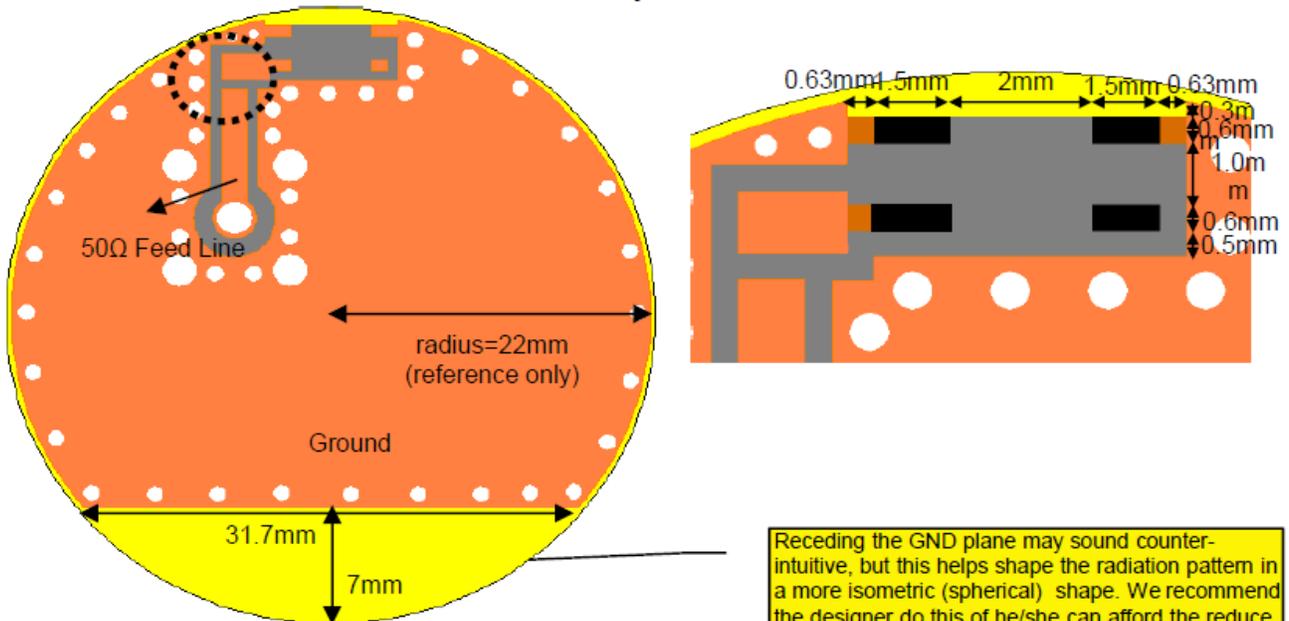
PCB Mounting Considerations - Rectangular 30mm x 50mm Evaluation Board



To request the layout file, send a message to: www.johansontechnology.com/ask-a-question
 Qualified customers can order a pre-tuned 50 EVB with a female SMA connector by clicking here: www.johansontechnology.com/request-a-sample
 Reference p/n: 2450AT42E0100-EB1SMA

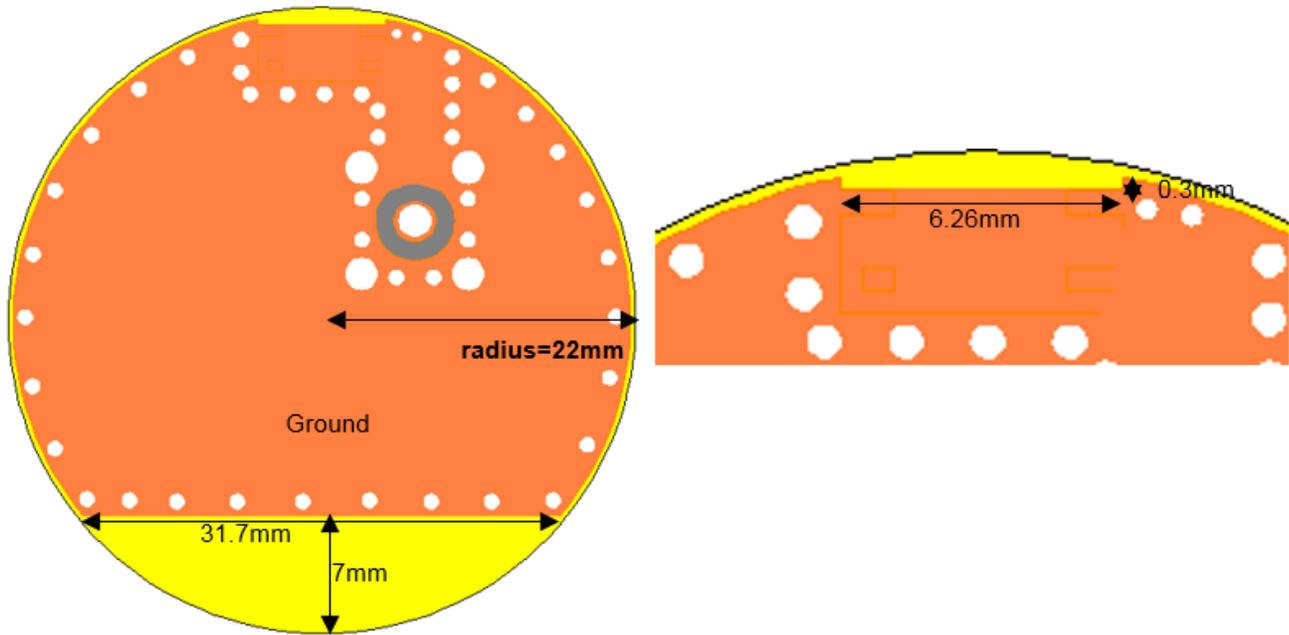
PCB Mounting Considerations - Circular PCB Environments (coin cell type)

Top View



Receding the GND plane may sound counter-intuitive, but this helps shape the radiation pattern in a more isometric (spherical) shape. We recommend the designer do this if he/she can afford the reduce SMT space, but not mandated.

Bottom View



Note: There's no orderable EVB available for the above "Mounting Considerations - Circular PCB Environments (coin cell type)" reference design

To request the layout file, send a message to: www.johansontechnology.com/ask-a-question

Resources

https://www.johansontechnology.com/datasheets/antennas/2450AT42E0100_Web.pdf

https://www.johansontechnology.com/datasheets/antennas/2450AT42E010B_Web.pdf

<https://www.johansontechnology.com/ipc-antenna-services>