

# Stamped Metal Niche WiFi7



AANI-NI-0012

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12.00 x 7.00 x 0.72 mm  
RoHS/RoHS II Compliant  
MSL Level = 1

## Features

- Low Cost
- Low Profile
- Robust performance even when employed in solutions requiring “potting/coating/over-mold”
- Based on Technology Patented by Abracon
- Highly efficient
- Low Return Loss: < -6.2 dB
- Integration: Along PCB Edge

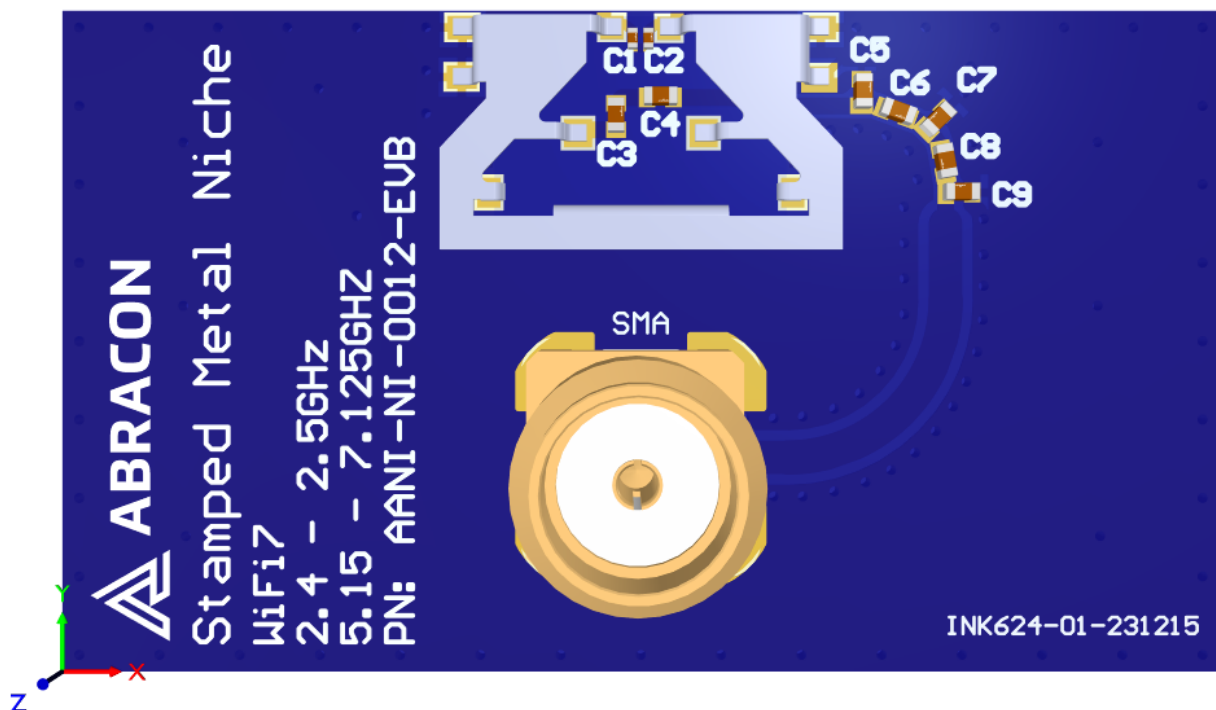
## Applications

- Tri-Band Wi-Fi (WiFi6E, WiFi7)
- Wi-Fi dual band (WiFi6)
- IoT, M2M
- Wearables
- Wireless Remote Control
- Personal Area Networks (PAN)
- Industrial/Commercial equipment

Option: For high volumes (EAU 100k+) see the cost-effective Niche Licensed Product PN: ANAE

## Product Image

The Stamped Metal Niche antenna is implemented on an evaluation board in the image below.



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## Electrical Specification

Parameter	Specification		Unit
Operating Frequency	2400 - 2500	5150 - 7125	MHz
Return Loss	< -7.1	< -6.2	dB
Polarization	Linear		-
Peak Gain	3.2	4.2	dBi
Efficiency	> -1.7 (68)	> -2.8 (52)	dB (%)
Impedance	50		$\Omega$

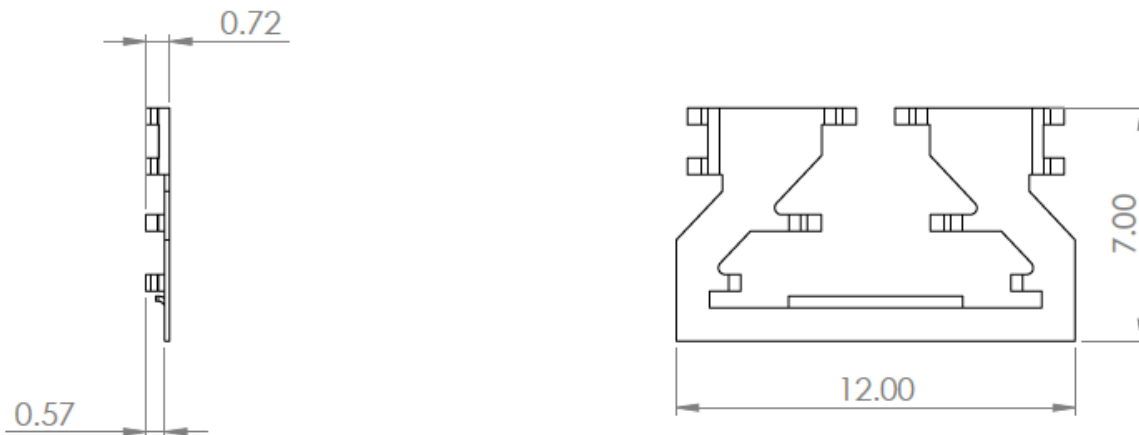
*Note: All measurements were conducted on the evaluation board in free space. Performance will vary depending on the ground plane, application, and environment.*

## Mechanical Specification

Parameter	Specification
Antenna Dimension	12.00 x 7.00 x 0.72 mm
Evaluation board Dimension	35 x 20 mm
Mounting Type	SMD

## Product Dimensions

The Stamped Metal Niche antenna is 12.00 x 7.00 mm in size, see dimensions in millimeters below. Drawing is shown by first angle projection.





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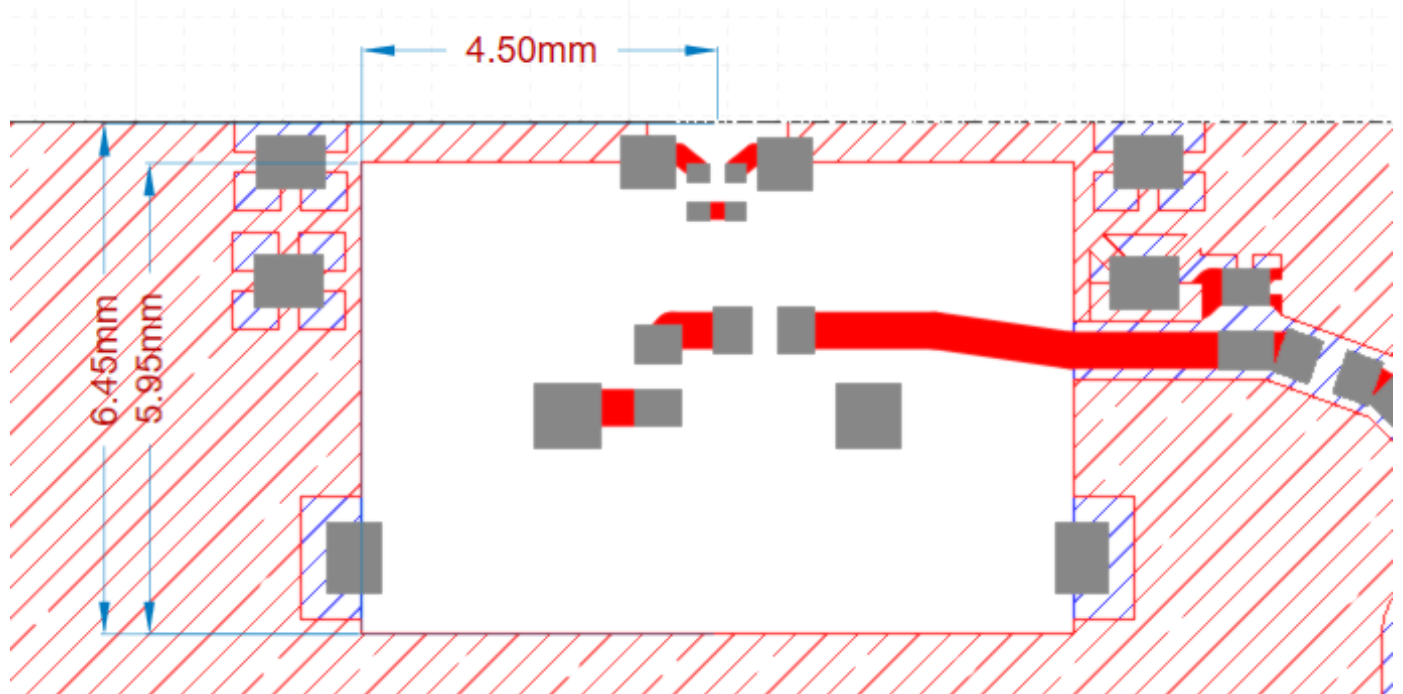
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## Antenna Footprint

The dimensions of the copper cutout and solder pad positions are shown in the image below. The antenna and the footprint are symmetrical. This means that the antenna can be fed from either left or right.



For a detailed antenna footprint, visit [Abracon's website](#).



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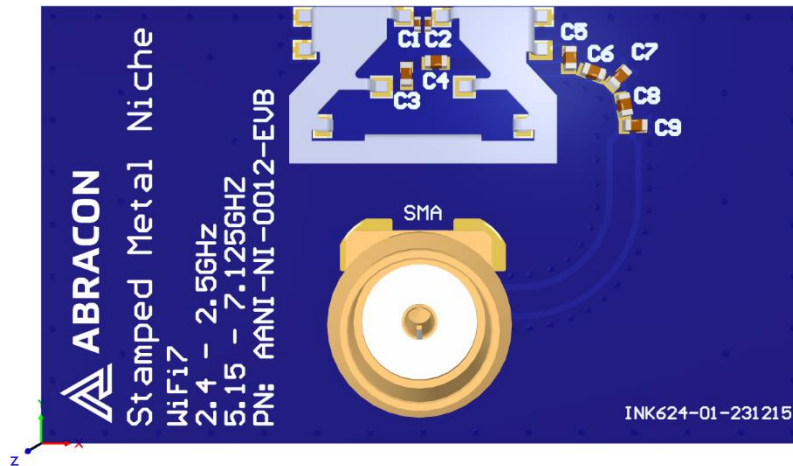
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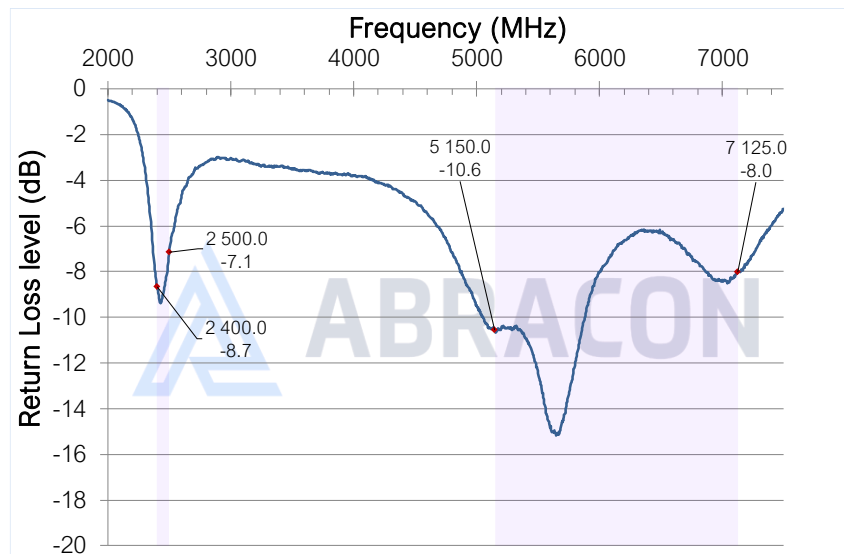
12.00 x 7.00 x 0.72 mm  
RoHS/RoHS II Compliant  
MSL Level = 1

## Measurement Setup

The antenna measurements were all done in free space, with the Stamped Metal Niche antenna implemented on its evaluation board that has a PCB size of 35 by 20 (X by Y) mm:



## Reflection Characteristics – Return Loss





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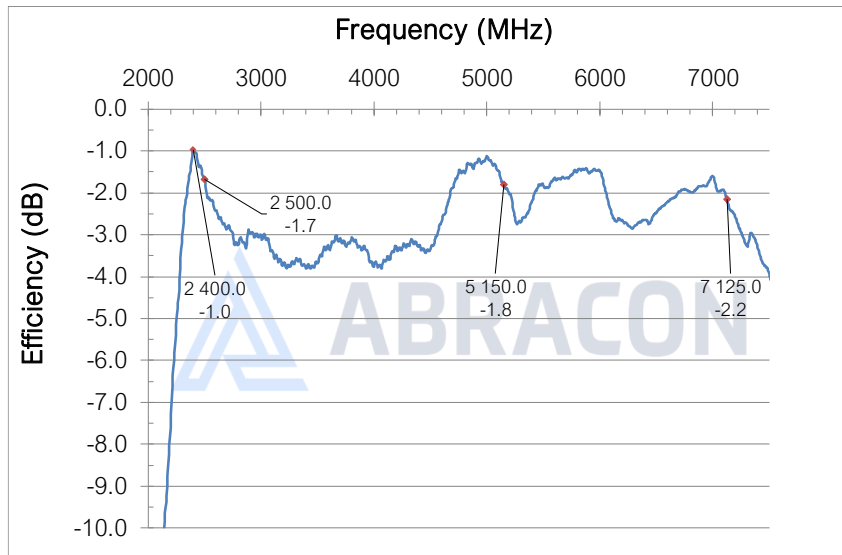


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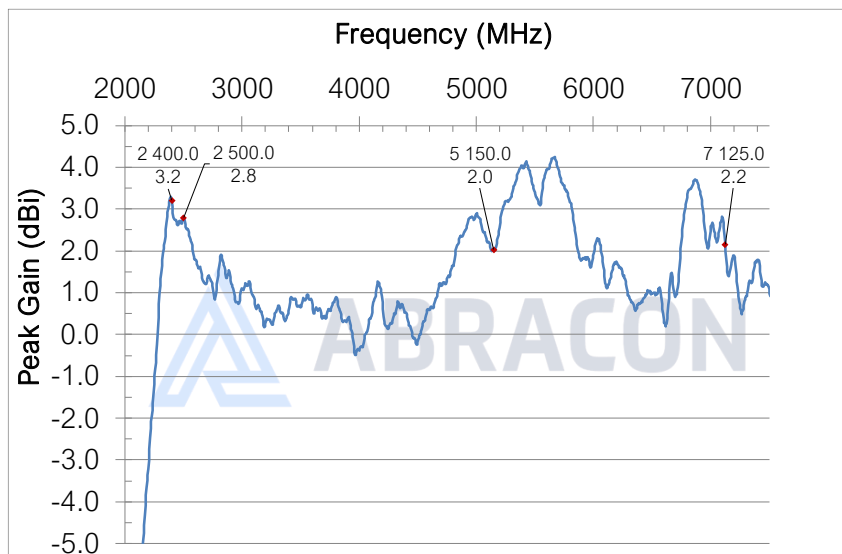


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## Radiation Characteristics – Total Efficiency



## Radiation Characteristics – Maximum Gain



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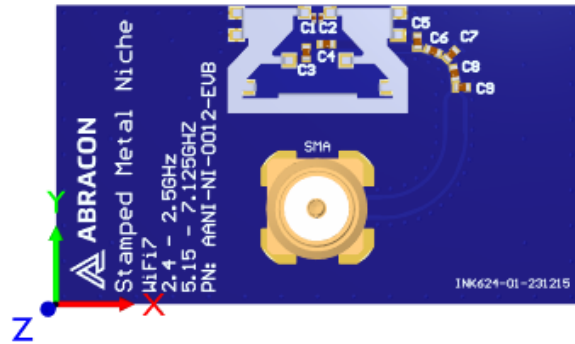
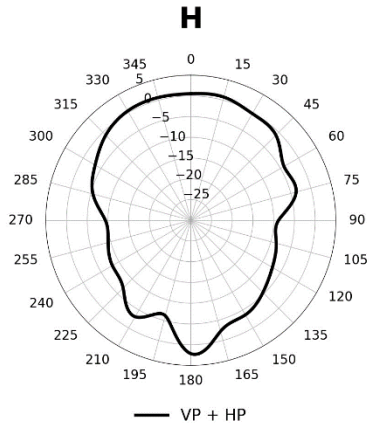
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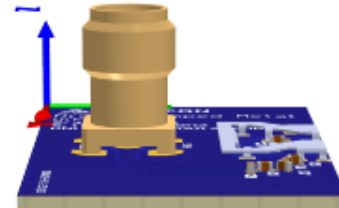
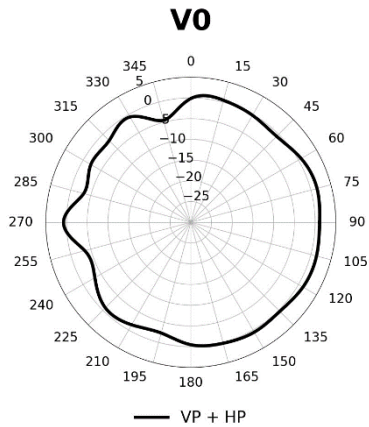
12.00 x 7.00 x 0.72 mm  
**RoHS/RoHS II Compliant**  
 MSL Level = 1

## Radiation Characteristics – 2D Pattern @ 2450 MHz

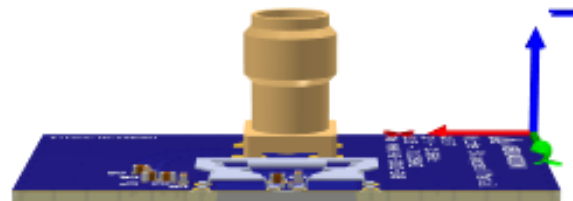
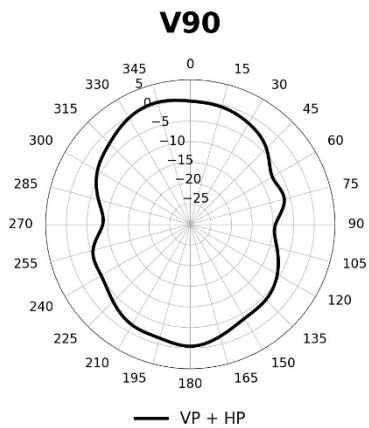
**XY-plane:**



**YZ-plane:**



**XZ-plane:**



VP: Vertical Polarization  
 HP: Horizontal Polarization

Unit: dBi



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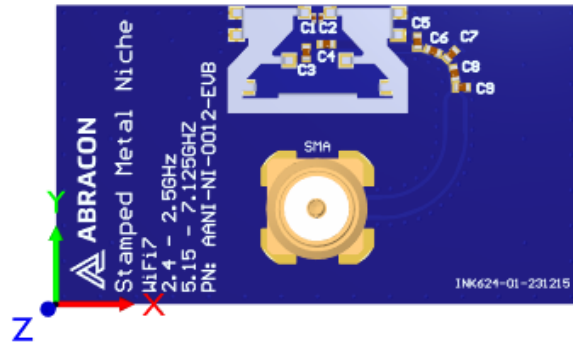
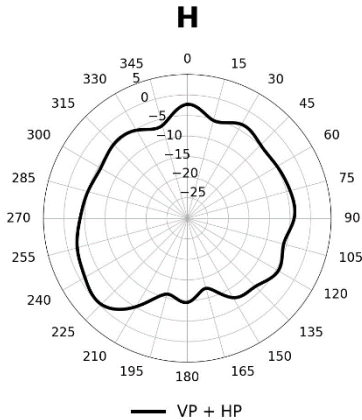
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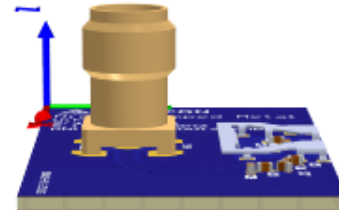
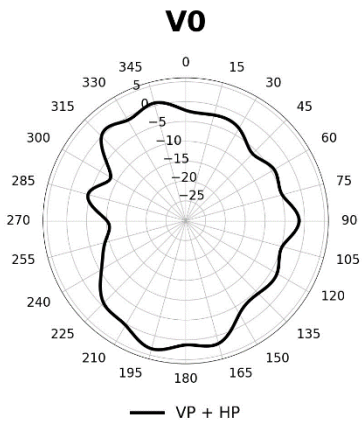
12.00 x 7.00 x 0.72 mm  
**RoHS/RoHS II Compliant**  
 MSL Level = 1

## Radiation Characteristics – 2D Pattern @ 5.75 GHz

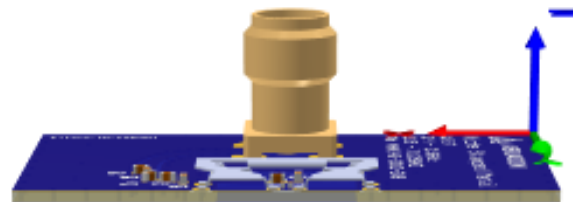
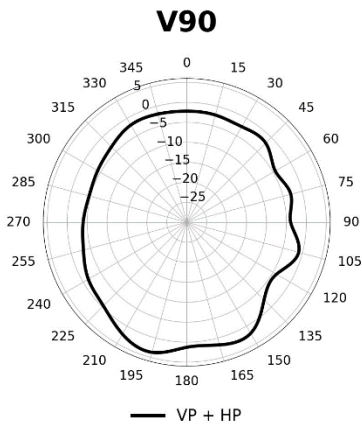
**XY-plane:**



**YZ-plane:**



**XZ-plane:**



VP: Vertical Polarization  
 HP: Horizontal Polarization

Unit: dBi

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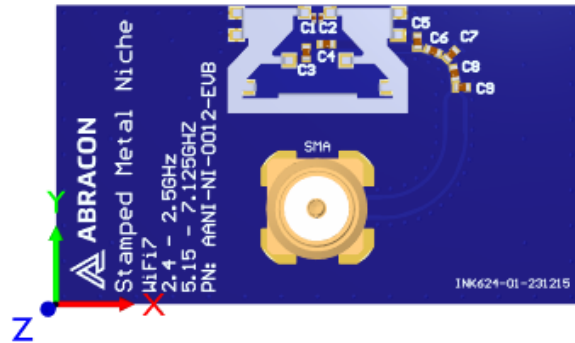
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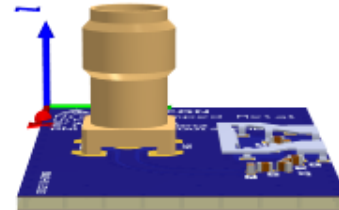
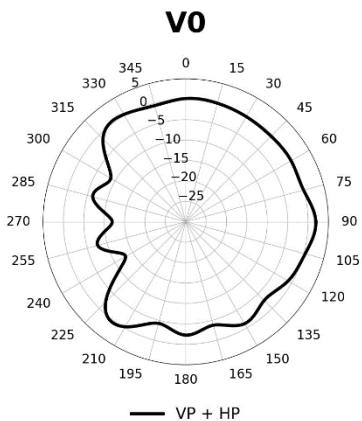
12.00 x 7.00 x 0.72 mm  
**RoHS/RoHS II Compliant**  
 MSL Level = 1

## Radiation Characteristics – 2D Pattern @ 6.75 GHz

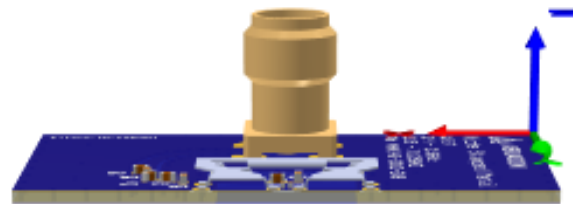
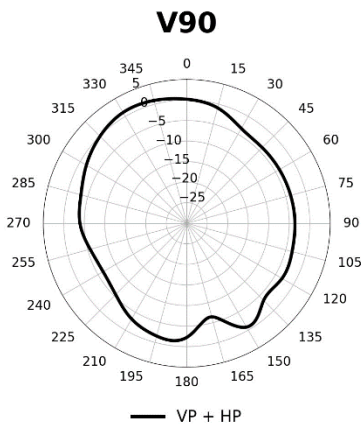
**XY-plane:**



**YZ-plane:**



**XZ-plane:**



VP: Vertical Polarization  
 HP: Horizontal Polarization

Unit: dBi



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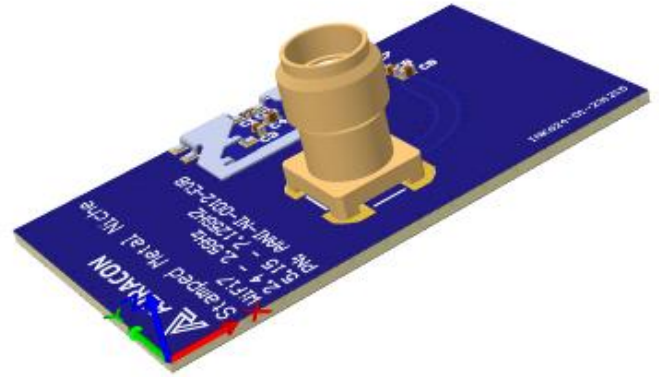
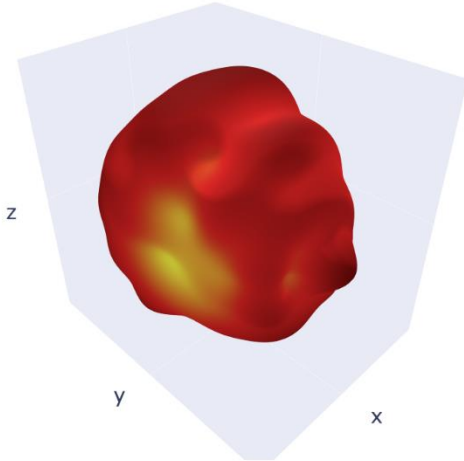
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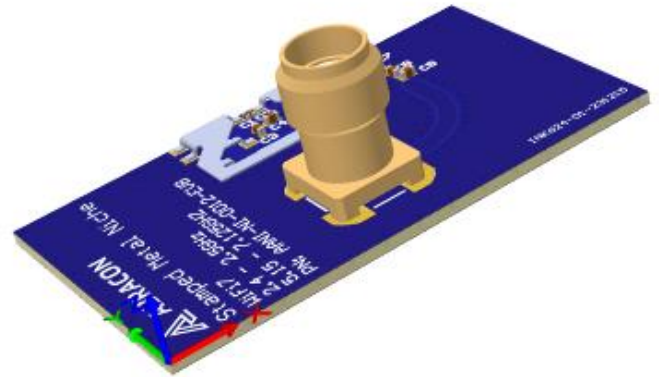
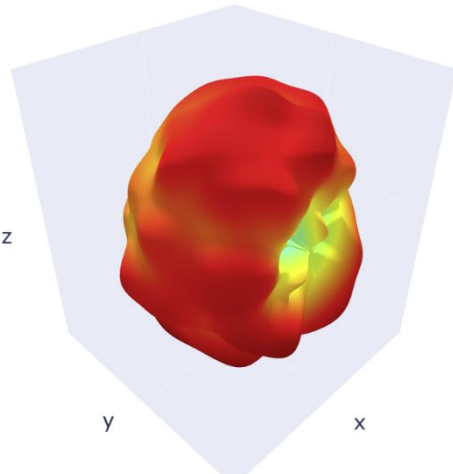
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MSL Level = 1

## Radiation Characteristics – 3D Pattern

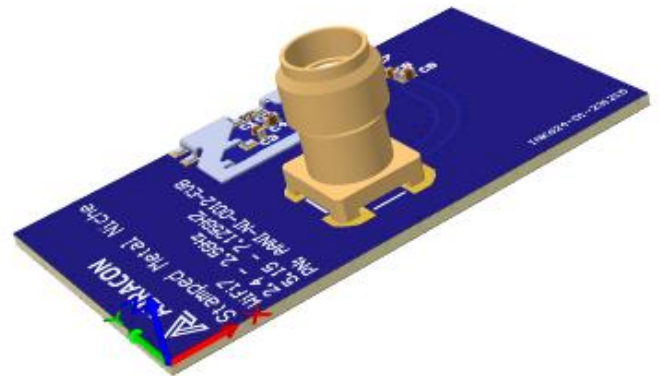
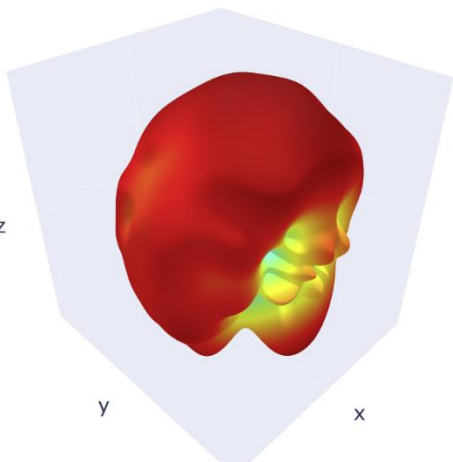
2.45 GHz



5.75 GHz



6.75 GHz





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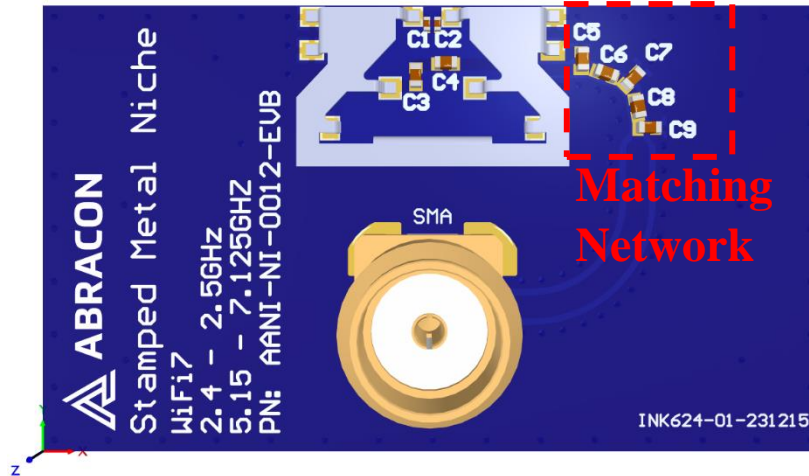
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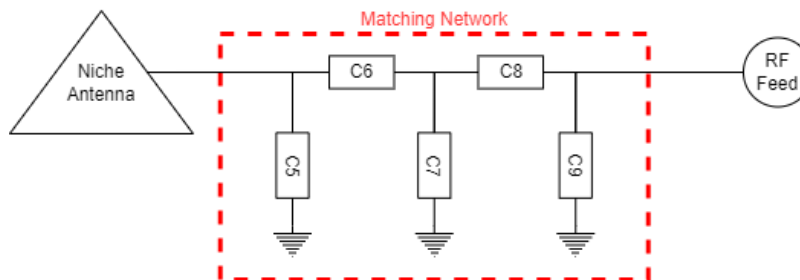
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**RoHS/RoHS II Compliant**  
**MSL Level = 1**

## Evaluation Board Outline & Matching Circuit

The evaluation board is developed to showcase the performance of the Stamped Metal Niche antenna on a typical PCB and to simplify antenna testing and evaluation. It has a size of 35 x 20 mm and includes an SMA connector. The performance will vary with different PCB sizes. Abracon can offer support to optimize the antenna for specific applications.



The evaluation board has a matching circuit implemented next to the antenna to enable optimization possibilities for the user. The component footprints are sized for 0402 (1005 metric) SMD components. Components C1-C4 are part of the antenna and will be disclosed upon design-in.



The standard tuning for the evaluation board is the following (can be replaced by equivalent):

- |  |  |
|--|--|
| C1, C2 = 0.1 pF (Murata GJM0335C1H1R0BB01) | C6 = 1.5 nH (Murata LQW15AN1N5B00)     |
| C3 = 0.8 pF (Murata GJM1555C1HR80WB01)     | C7 = 16 nH (Murata LQW15AN16NG00)      |
| C4 = 0.6 pF (Murata GJM1555C1HR80WB01)     | C8 = 1.8 pF (Murata GJM1555C1H1R8WB01) |
| C5 = Not Mounted                           | C9 = Not Mounted                       |

However, it is common that the resonant frequency will shift during implementation in an arbitrary device. Therefore, this matching may be changed with other values/components/brands for compensation of such effects. This is further described in the General Implementation Guidelines section below.



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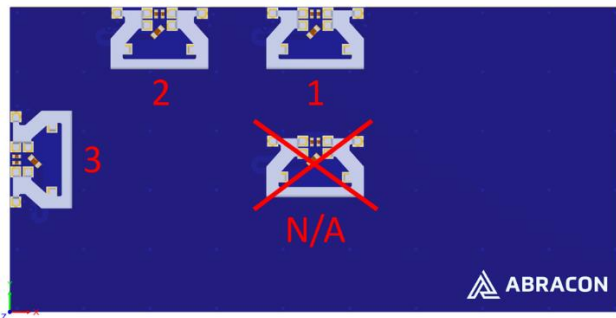


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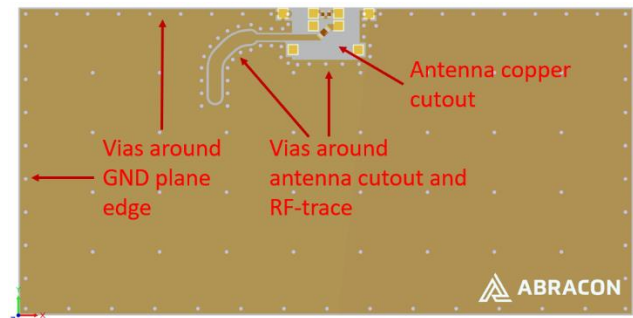
## General Implementation Guidelines for the Stamped Metal Niche antenna

The antenna can be positioned in different ways, although there are some positions which are more beneficial. The left picture shows a typical PCB with examples on different antenna positions. The optimal position is option 1. Options 2 and 3 are also possible. The antenna must be placed along the PCB edge, i.e., it cannot be placed in the middle. Option 2 or 3 may be the best option for larger PCBs (>> 35 x 20 mm).

Antenna Positions:



Antenna cutout & via-structure:



The rectangular copper cutout in the footprint needs to go through all the layers in the PCB stackup, meaning that there cannot be copper on any layer in this area. It is also recommended to have a good via-structure around the cutout and the edge of the ground plane, see the right image above.

It shall also be highlighted that plastic and metal parts in the near proximity of antennas may influence the antenna tuning and/or performance. This aspect should be noted as a general guideline for all antennas. The effects are difficult to estimate without detailed information, but it is common that a plastic housing above the antenna shifts the resonant frequency down. It is recommended to measure the antenna in the actual device after implementation and to implement a matching network on the antenna feed to adjust for the potential frequency shift.

The Stamped Metal Niche antenna has shown good performance in proximity to metal and other harsh antenna environments.

## Packaging Information

Qty per reel: 3600pcs

Reel size: 13'

Carton box size: 35\*35\*40cm

No. of reel per box: 13 reels

Weight per box: about 10kg

Qty per box: 46800pcs

**ATTENTION:** Abracon LLC's products are Commercial-Off-The-Shelf (COTS), which are designed, intended, and validated for use in commercial, industrial, and automotive applications. The customer is responsible for testing and verifying the performance of an Abracon solution to meet their system-level requirements.



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