

Stamped Metal Niche WiFi7



AANI-NI-0012

Request Samples



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

Features

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

Applications

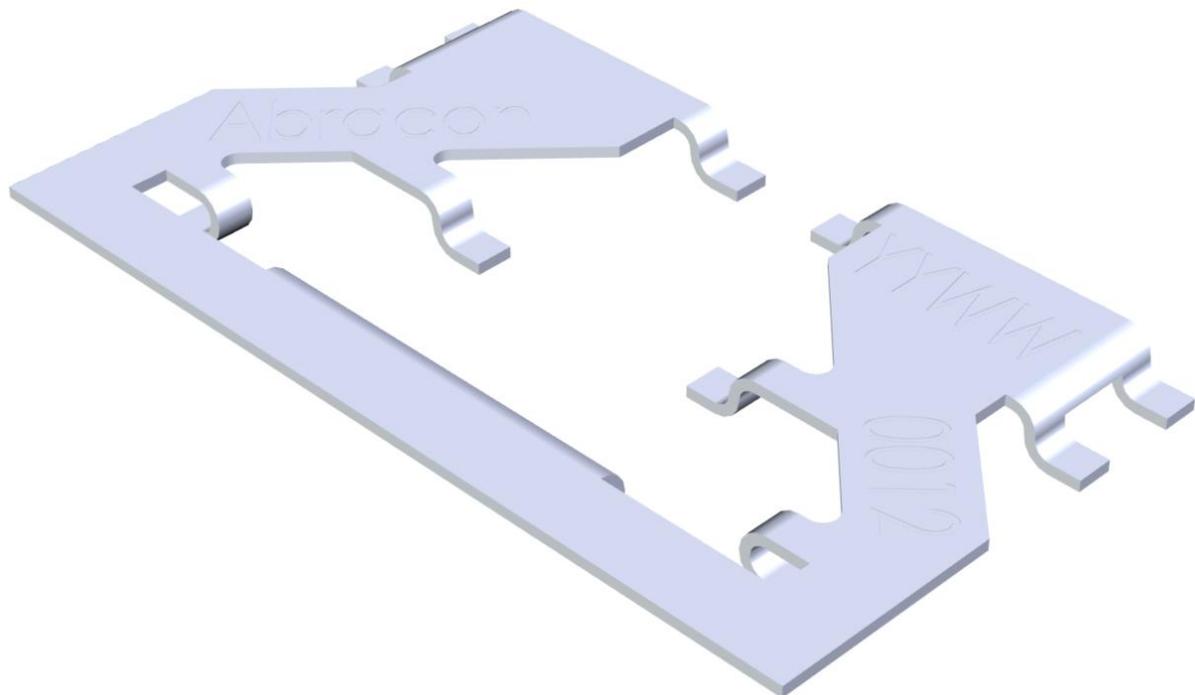
- Tri-Band Wi-Fi (WiFi6E, WiFi7)
- Wi-Fi dual band (WiFi6)
- IoT, M2M
- Wearables
- Wireless Remote Control
- Personal Area Networks (PAN)
- Industrial/Commercial equipment

Technology is based on Abracon's intellectual property.

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

Product Image

The Stamped Metal Niche WiFi7 antenna.



5101 Hidden Creek Ln Spicewood TX 78669
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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		Ω

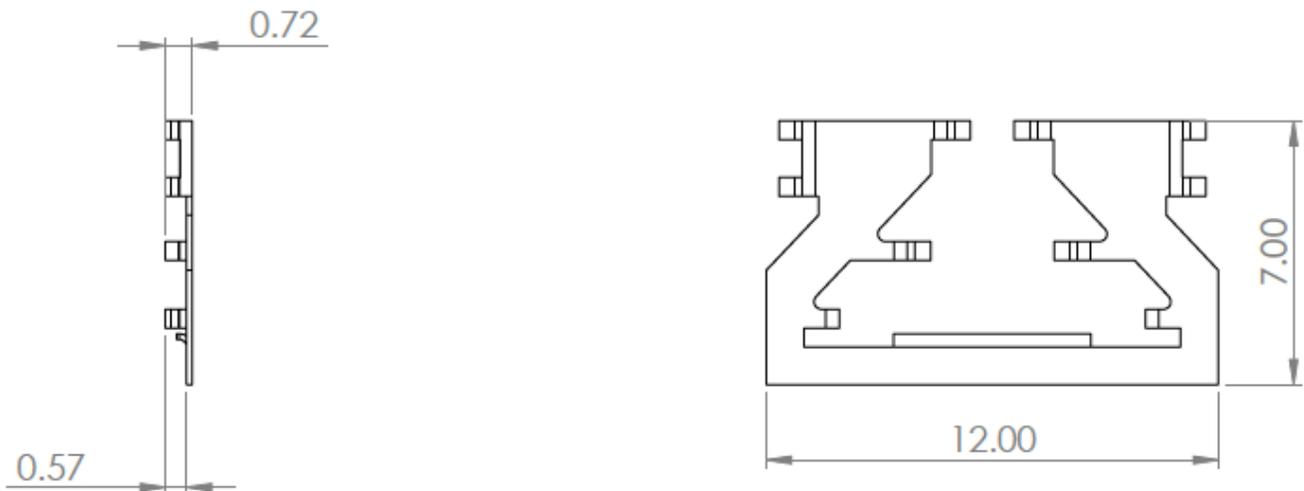
Note: All measurements were conducted on the evaluation board in free space. Performance will vary depending on the ground plane, application, and environment.

Mechanical Specification

Parameter	Specification
Antenna Dimensions	12.00 x 7.00 x 0.72 mm
Evaluation Board Ground Plane Dimensions	35 x 20 mm
Mounting Type	SMD

Product Dimensions

The Stamped Metal Niche antenna is 12.00 x 7.00 x 0.72 mm in size. Drawing is shown by first angle projection.



Unit: mm



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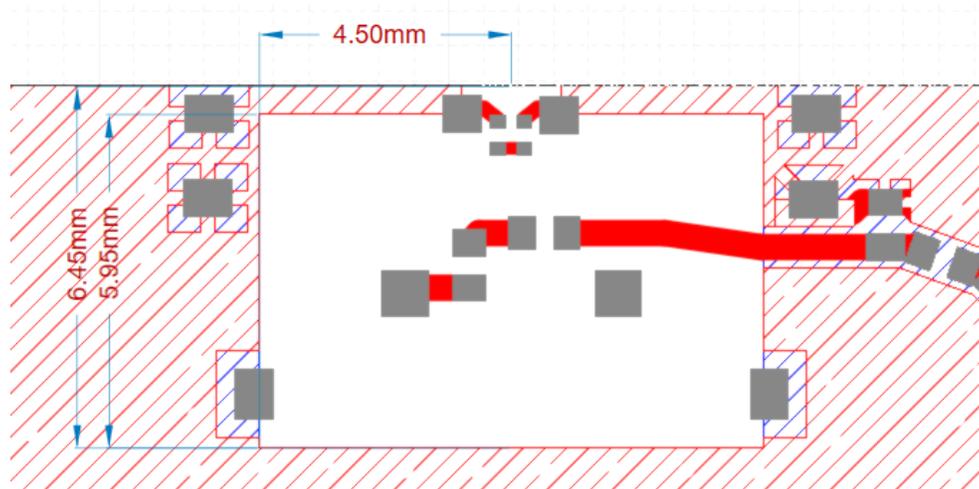


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Antenna Footprint

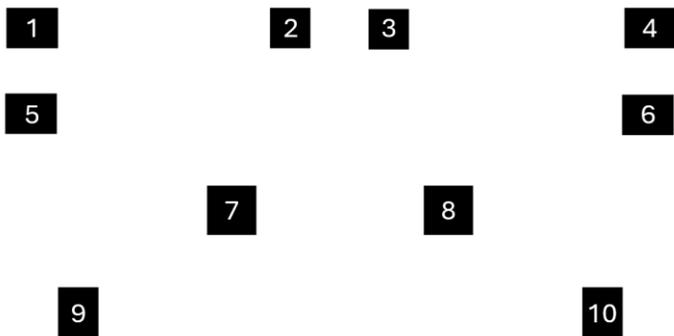
The dimensions of the copper cutout and solder pad positions are shown in the image below. The antenna and the footprint are symmetrical. This means that the antenna can be fed from either side (from the right in the example).

For a detailed antenna footprint example: <https://abracon.com/Support/Footprint/AANI-NI-0012-EVB-Footprint.zip>



Antenna Pin Numbering

The antenna should be mounted on a ground (GND) plane, keeping the correct clearance area(s). 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 there is ground clearance around the non-connected (NC) pads, through all layers of the PCB. Thanks to symmetry, the antenna can be fed on either pad 7 or 8. Pads 2 and 3 are connected via top load capacitors. Thermal relief connections can be utilized on the GND pads.



Pin	Feeding from the Right	Feeding from the Left
1	GND	GND
2	Top Load	Top Load
3	Top Load	Top Load
4	GND	GND
5	GND	GND
6	GND	GND
7	RF-feed	NC
8	NC	RF-feed
9	NC	NC
10	NC	NC

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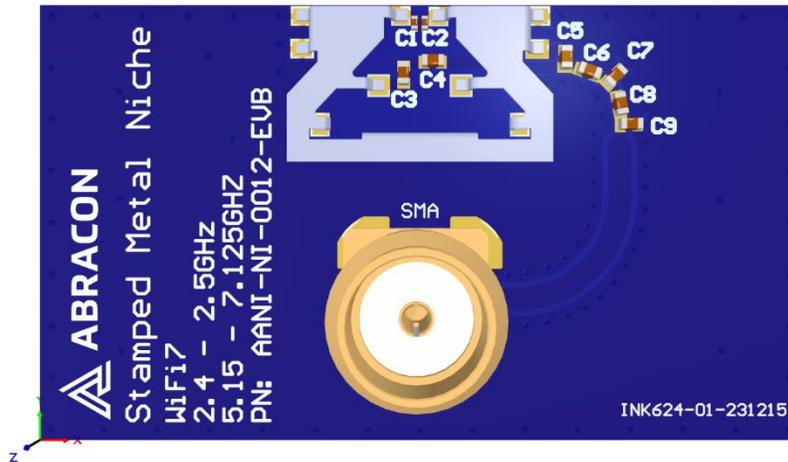
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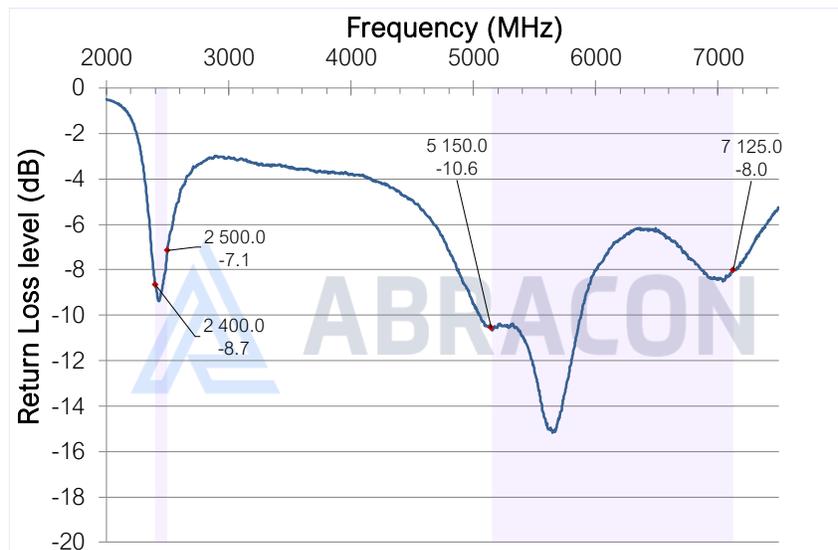
12.00 x 7.00 x 0.72 mm
RoHS/RoHS II Compliant
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Measurement Setup

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



Reflection Characteristics – Return Loss



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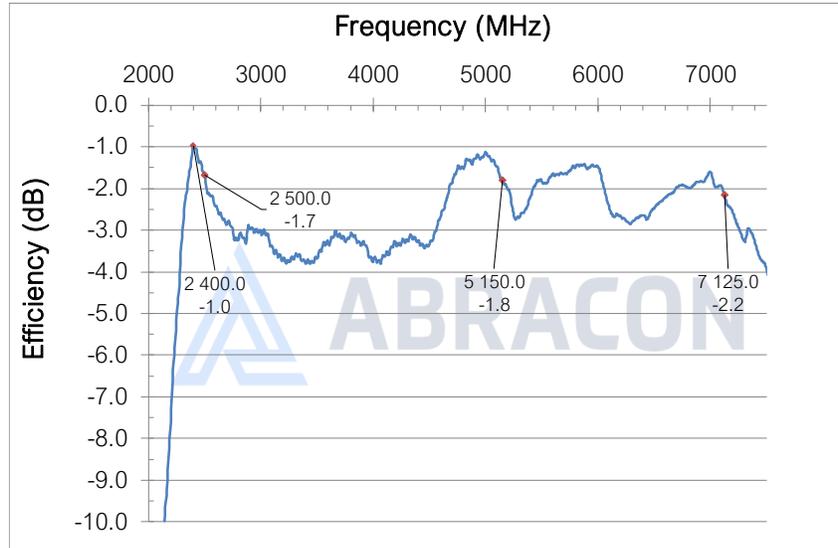


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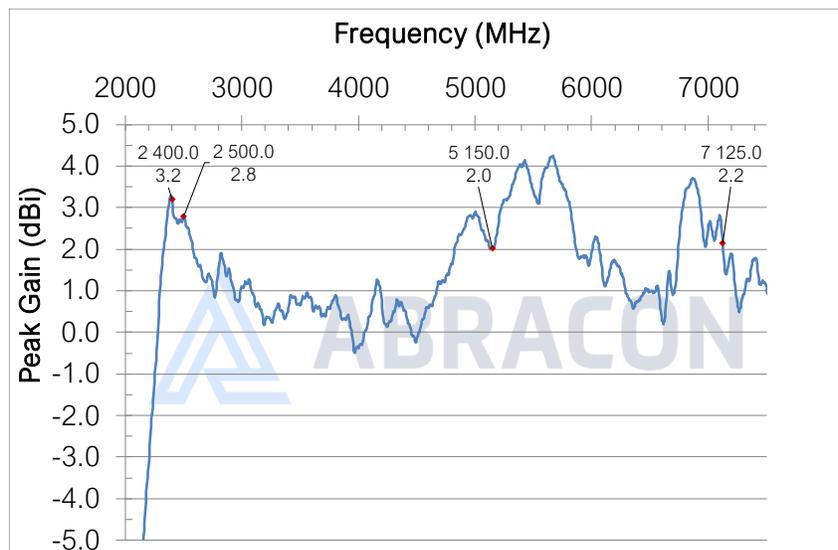


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Radiation Characteristics – Total Efficiency



Radiation Characteristics – Maximum Gain



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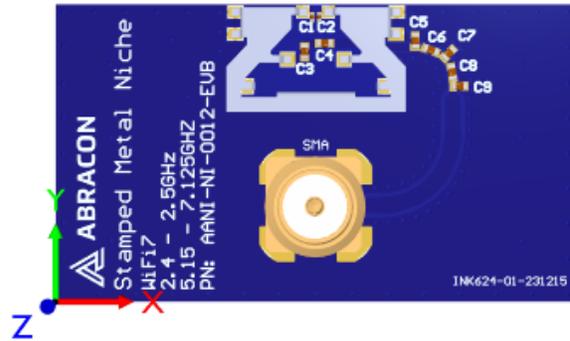
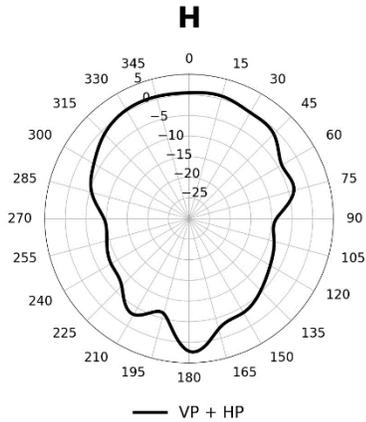
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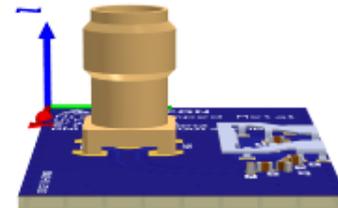
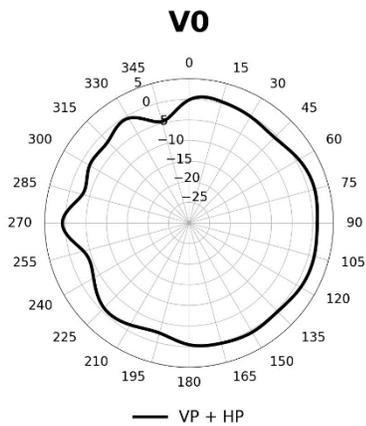
12.00 x 7.00 x 0.72 mm
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 MSL Level = 1

Radiation Characteristics – 2D Pattern @ 2450 MHz

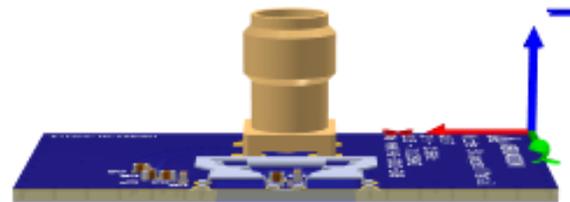
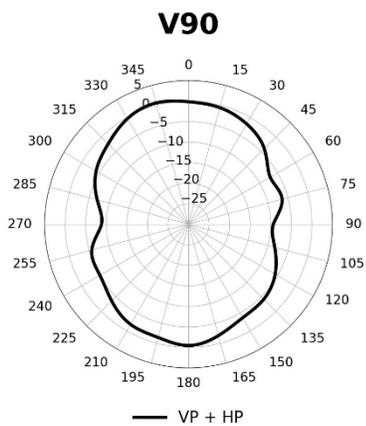
XY-plane:



YZ-plane:



XZ-plane:



VP: Vertical Polarization
 HP: Horizontal Polarization

Unit: dBi



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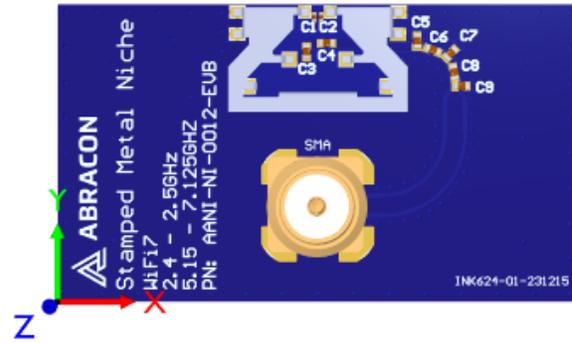
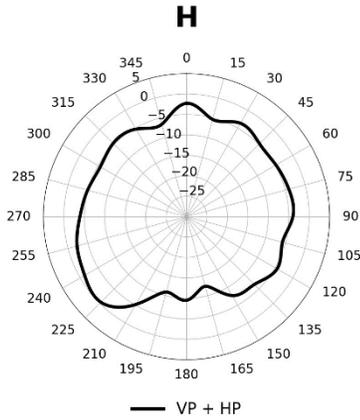
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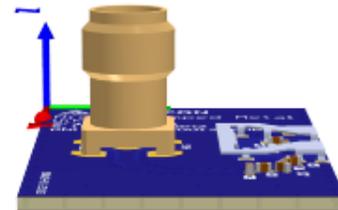
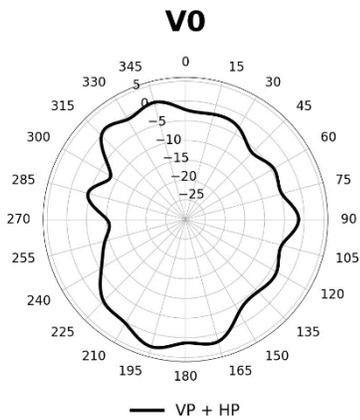
12.00 x 7.00 x 0.72 mm
RoHS/RoHS II Compliant
 MSL Level = 1

Radiation Characteristics – 2D Pattern @ 5.75 GHz

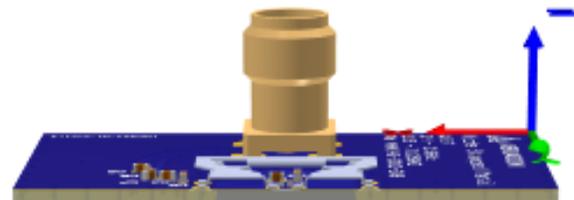
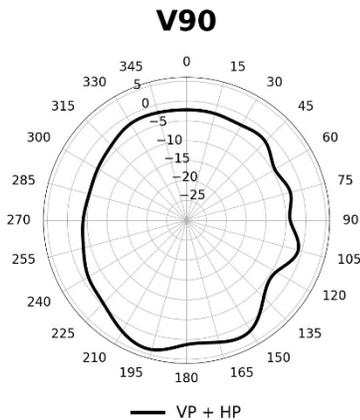
XY-plane:



YZ-plane:



XZ-plane:



VP: Vertical Polarization
 HP: Horizontal Polarization

Unit: dBi



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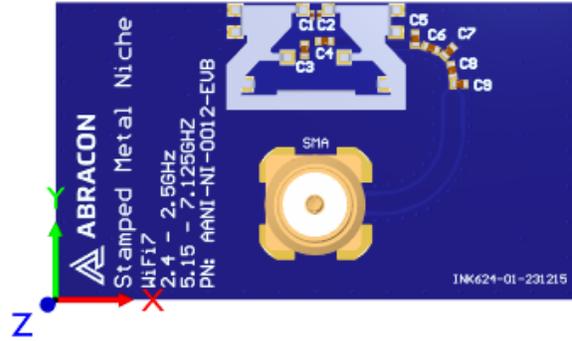
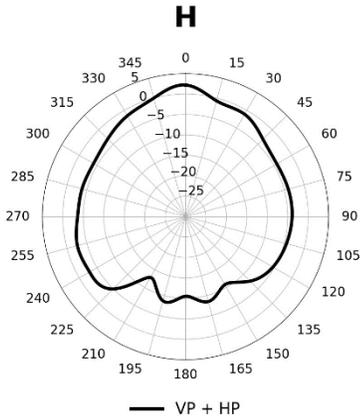
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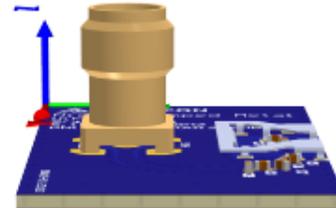
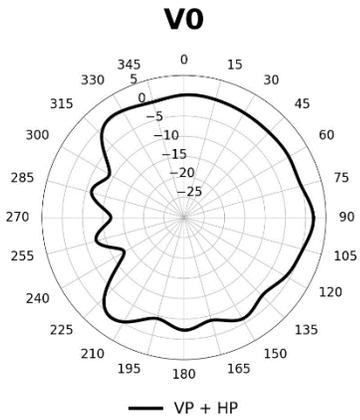
12.00 x 7.00 x 0.72 mm
RoHS/RoHS II Compliant
 MSL Level = 1

Radiation Characteristics – 2D Pattern @ 6.75 GHz

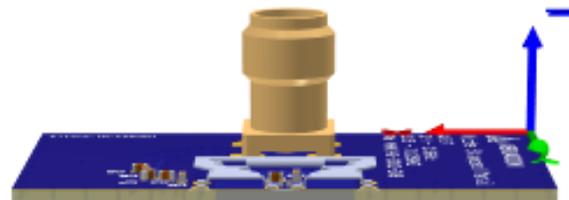
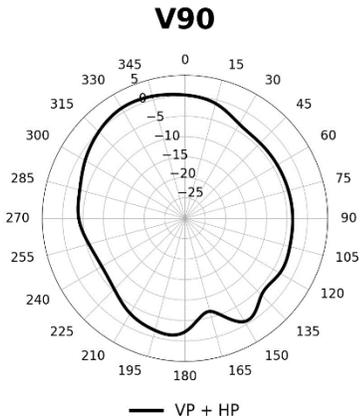
XY-plane:



YZ-plane:



XZ-plane:



VP: Vertical Polarization
 HP: Horizontal Polarization

Unit: dBi



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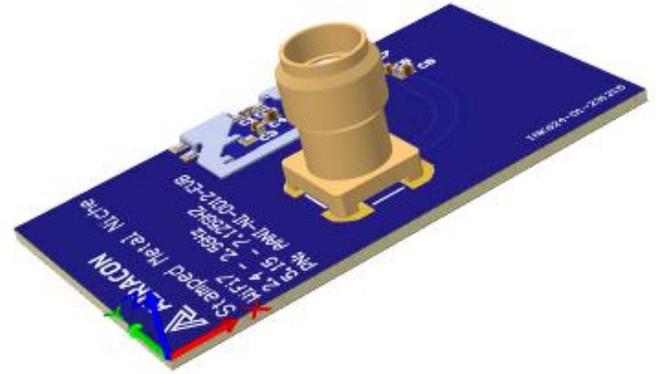
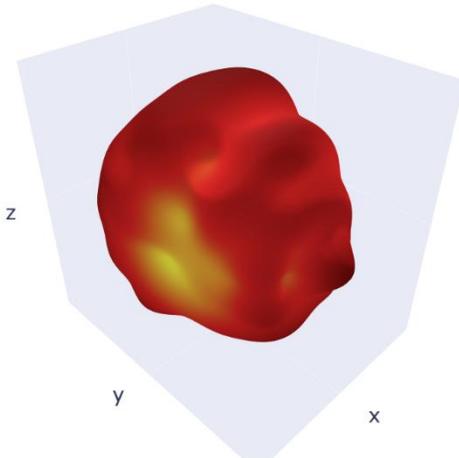
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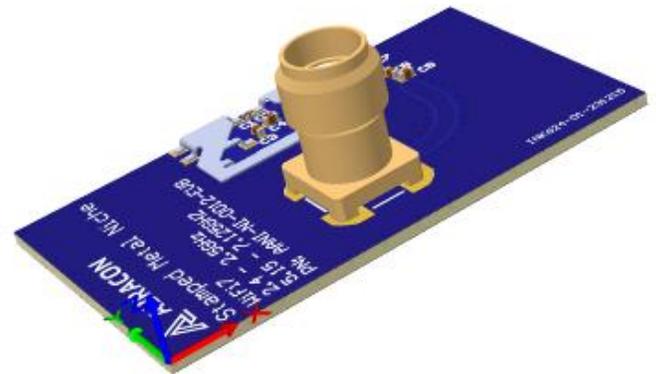
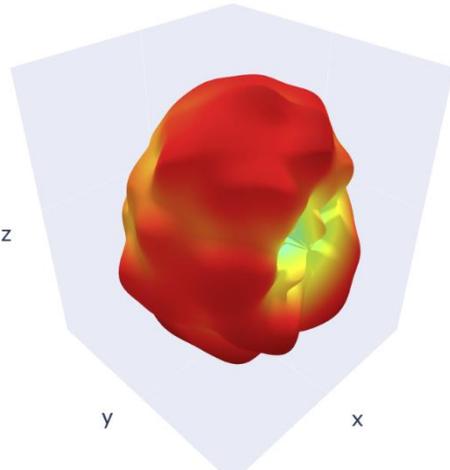
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MSL Level = 1

Radiation Characteristics – 3D Pattern

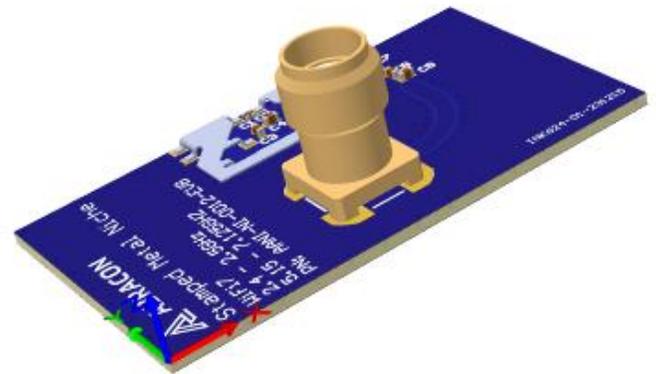
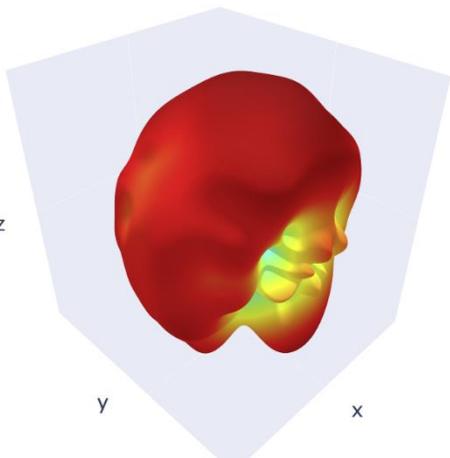
2.45 GHz



5.75 GHz



6.75 GHz





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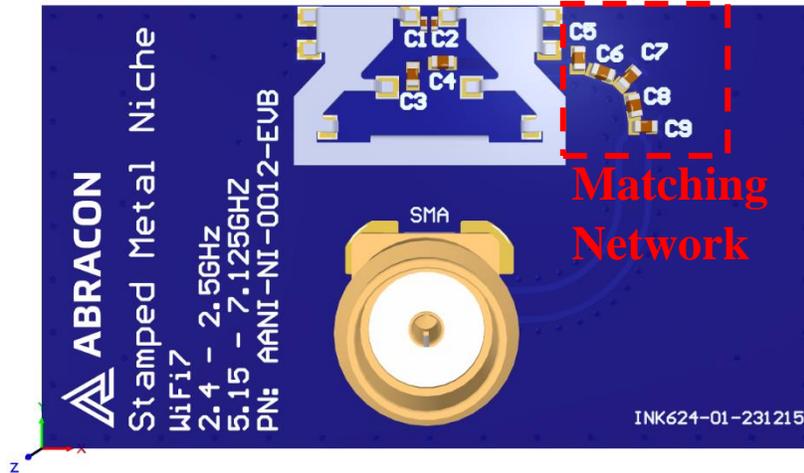
Check Inventory



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Evaluation Board Outline & Matching Circuit

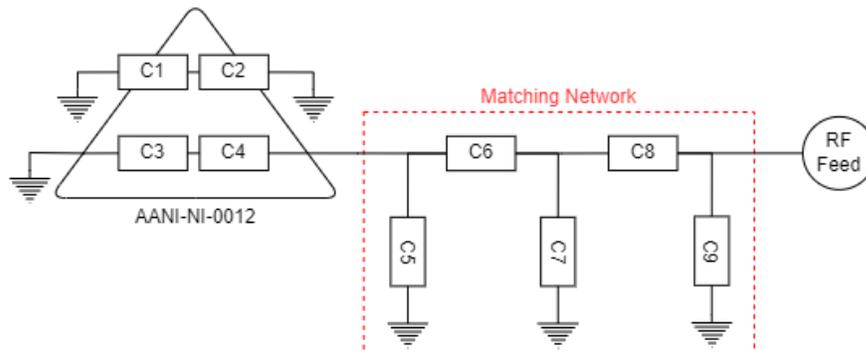
The evaluation board (Abracon P/N: AANI-NI-0012-EVB) is developed to showcase the performance of the Stamped Metal Niche antenna on a typical PCB and to simplify antenna testing and evaluation. It has a size of 35 x 20 mm and includes a SMA connector. The performance will vary with different PCB sizes. 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 C1-C2 component footprints are sized for 0201 (0603 metric) SMD components. The C3-C9 component footprints are sized for 0402 (1005 metric) SMD components.

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

- | | |
|--|--|
| C1, C2 = 0.1 pF (Murata GRM0335C1HR10WA01) | C6 = 1.5 nH (Murata LQW15AN1N5B00) |
| C3 = 0.8 pF (Murata GJM1555C1HR80WB01) | C7 = 16 nH (Murata LQW15AN16NG00) |
| C4 = 0.6 pF (Murata GJM1555C1HR60WB01) | 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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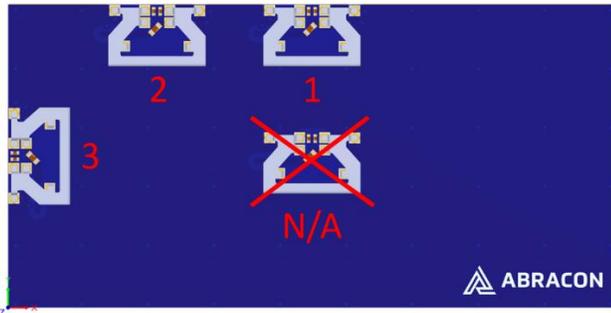


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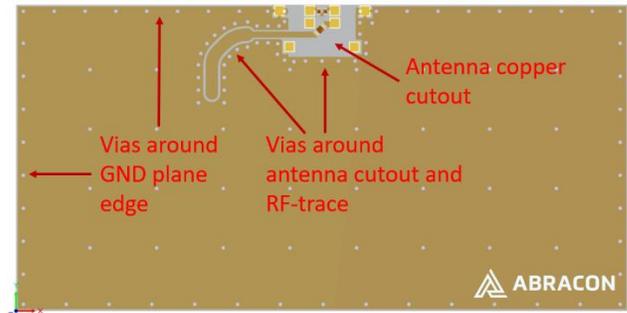
General Implementation Guidelines for the Stamped Metal Niche antenna

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:



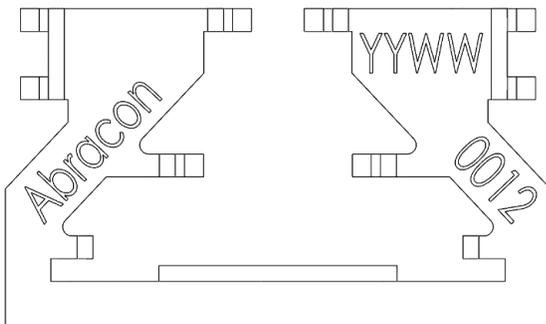
The rectangular copper cutout in the footprint needs to go through all the layers in the PCB stackup, meaning that there cannot be copper on any layer in this area. It is also recommended to have a good via-structure around the cutout and the edge of the ground plane, see the right image above.

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 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 such as potting.

Part Marking

The top marking of the antenna is arranged according to the following illustration:



“YYWW” is the date code:

YY = Year

WW = Week

“0012” is the product ID (AANI-NI-0012)



AANI-NI-0012

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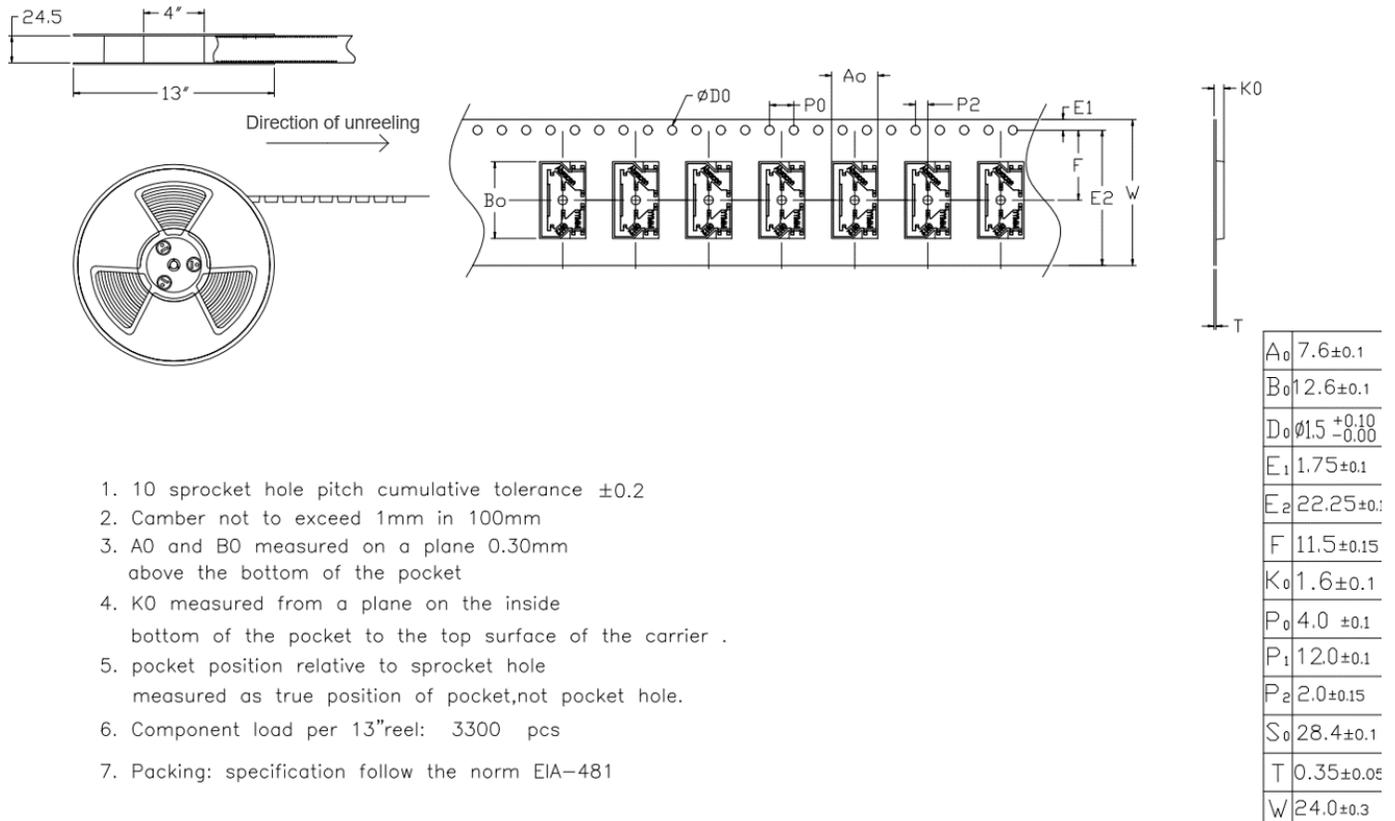
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Packaging Information

The antenna is delivered on tape and reel according to the following specifications.



1. 10 sprocket hole pitch cumulative tolerance ± 0.2
2. Camber not to exceed 1mm in 100mm
3. A₀ and B₀ measured on a plane 0.30mm above the bottom of the pocket
4. K₀ measured from a plane on the inside bottom of the pocket to the top surface of the carrier .
5. pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.
6. Component load per 13" reel: 3300 pcs
7. Packing: specification follow the norm EIA-481

Unit: mm (unless otherwise noted)

Carton box size: 35*35*40cm

No. of reel per box: 13 reels

Weight per box: about 10kg

Qty per box: 42900pcs

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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