

Stamped Metal Niche 2.4GHz – Evaluation Kit



AANI-NI-0013-EVB

Request Samples



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50 x 20 mm

RoHS/RoHS II Compliant

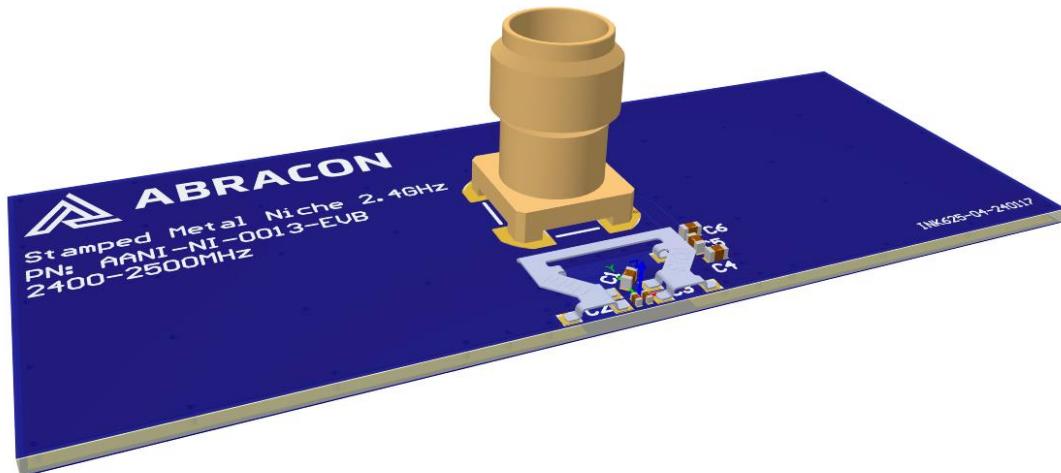
MSL Level = 1

Description

The AANI-NI-0013-EVB evaluation kit is designed to provide a means to facilitate engineering evaluation of the "Stamped Metal Niche 2.4GHz" antenna: AANI-NI-0013

The kit includes an evaluation board with SMA connector + three additional antennas for further testing.

Product Image



5101 Hidden Creek Ln Spicewood TX 78669
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Electrical Specification

Parameter	Specification	Unit
Operating Frequency	2400 - 2500	MHz
Return Loss	< -10.1	dB
Polarization	Linear	-
Peak Gain	3.2	dBi
Efficiency	> -1.2 (76)	dB (%)
Impedance	50	Ω

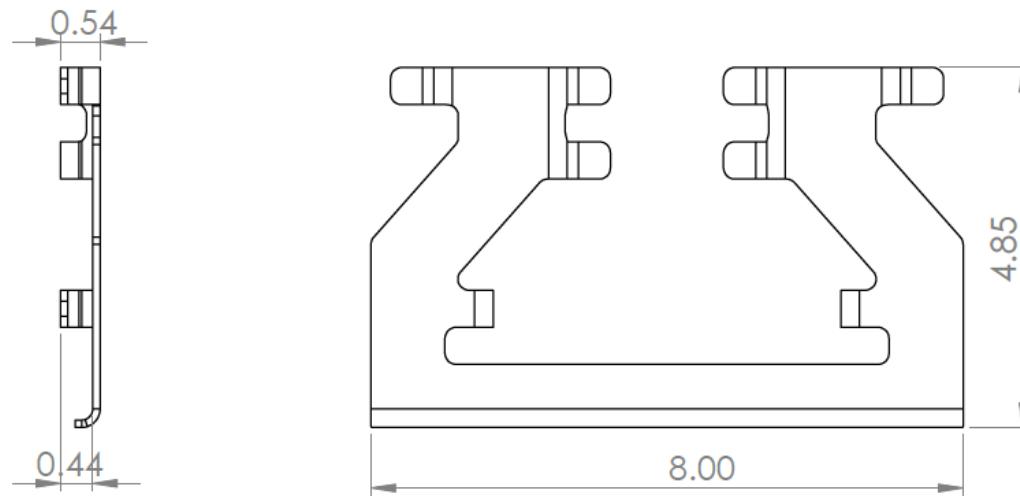
Note: All measurements were conducted on the evaluation board in free space. Performance will vary depending on the ground plane, application, and environment.

Mechanical Specification

Parameter	Specification
Evaluation Board Dimensions	50 x 20 mm
Mounting Type	SMA connector + SMD

Antenna Dimensions

The Niche stamped metal antenna is 8.00 x 4.85 x 0.54 mm in size. Drawing is shown by first angle projection.



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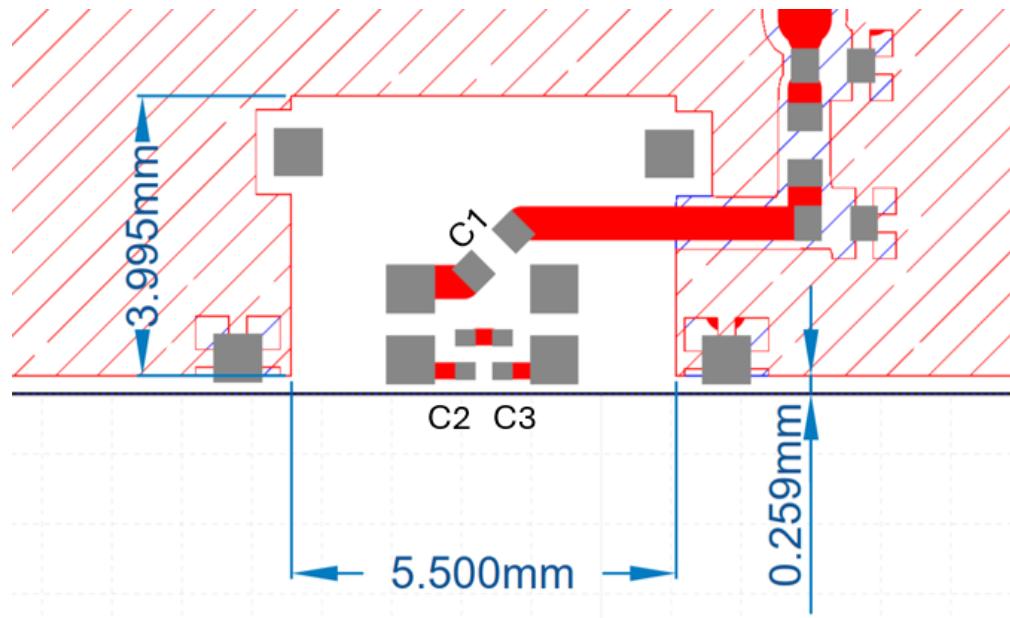
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Antenna Footprint

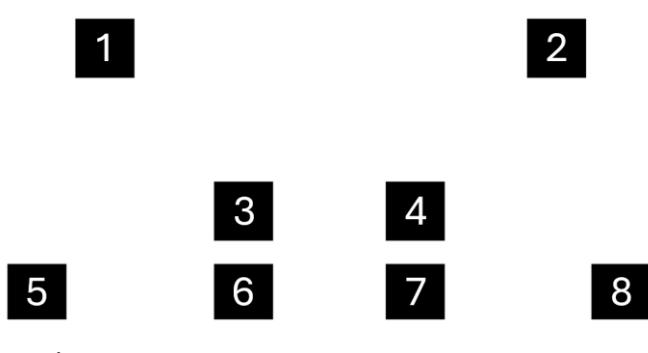
The dimensions of the copper cutout and solder pad positions are shown in the image below. The antenna and the footprint are symmetrical. This means that the antenna can be fed from either side (from the right in the example).

For a detailed antenna footprint example: <https://abracon.com/Support/Footprint/AANI-NI-0013-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 3 or 4. Pads 6 and 7 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	NC	NC
2	NC	NC
3	RF-feed	NC
4	NC	RF-feed
5	GND	GND
6	Top Load	Top Load
7	Top Load	Top Load
8	GND	GND

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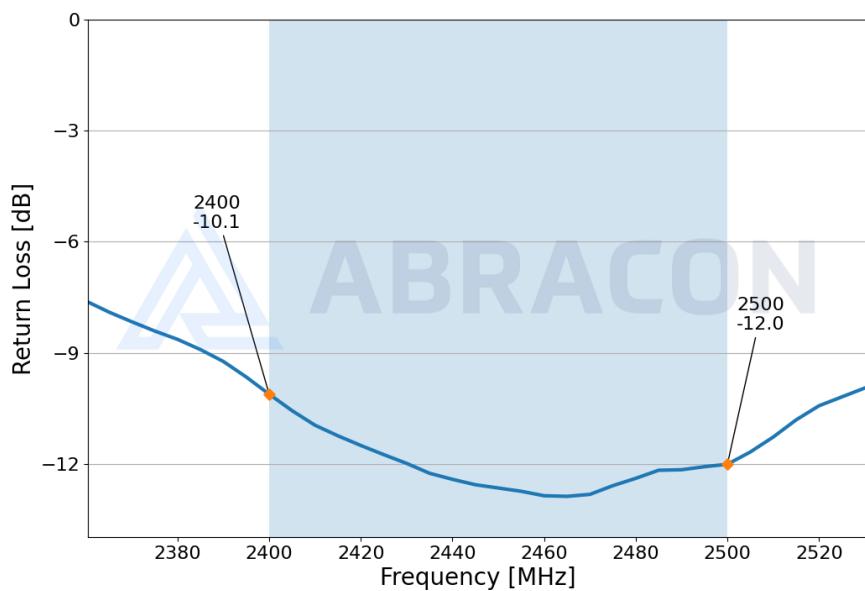
50 x 20 mm
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Measurement Setup

The antenna measurements were all done in free space, with the Niche antenna implemented on its evaluation board that has a PCB size of 50 by 20 (X by Y) mm.



Reflection Characteristics – Return Loss



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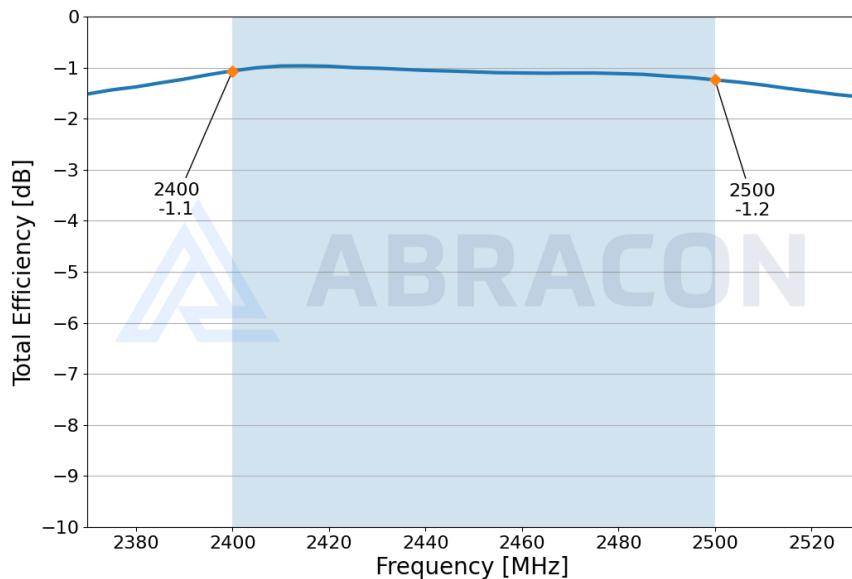


50 x 20 mm

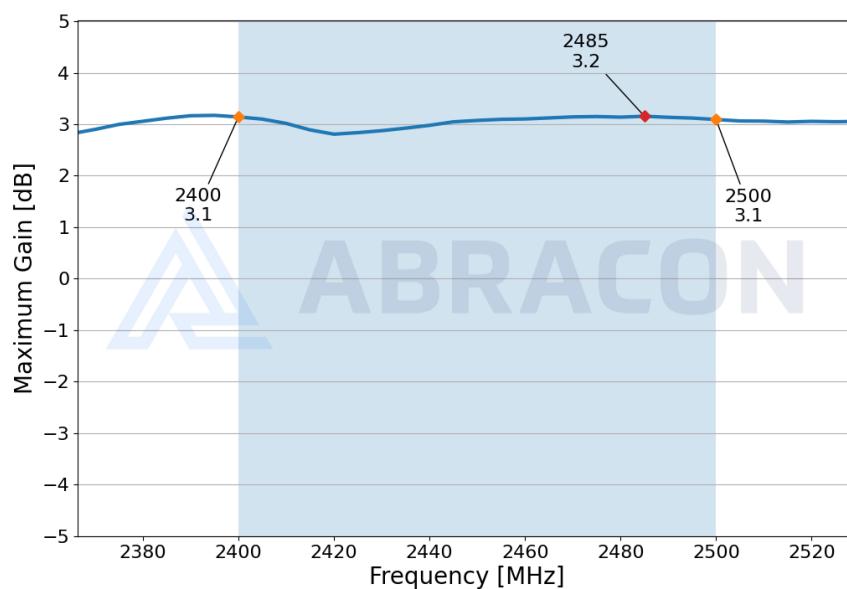
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Radiation Characteristics – Total Efficiency



Radiation Characteristics – Maximum Gain



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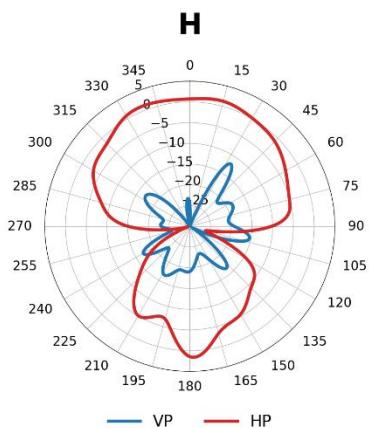
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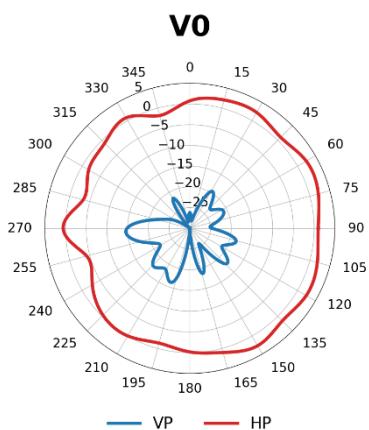
50 x 20 mm
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Radiation Characteristics – 2D Pattern @ 2450 MHz

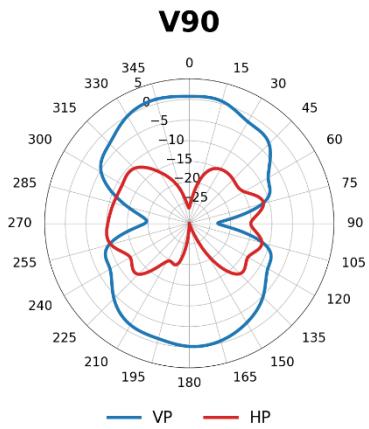
XY-plane:



YZ-plane:

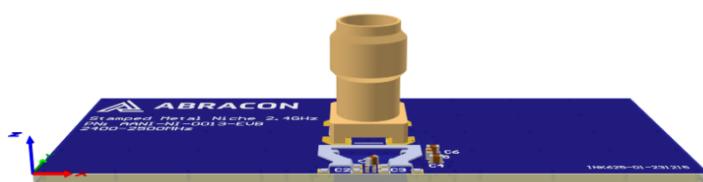
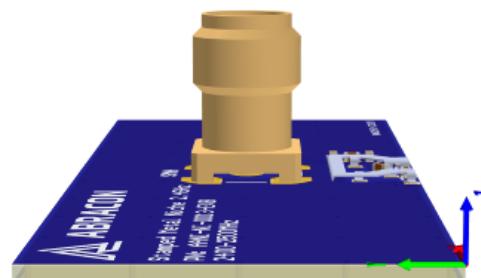


XZ-plane:



VP: Vertical Polarization
HP: Horizontal Polarization

Unit: dBi



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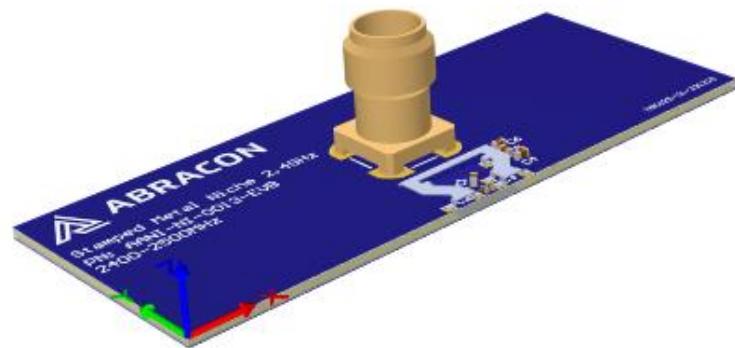
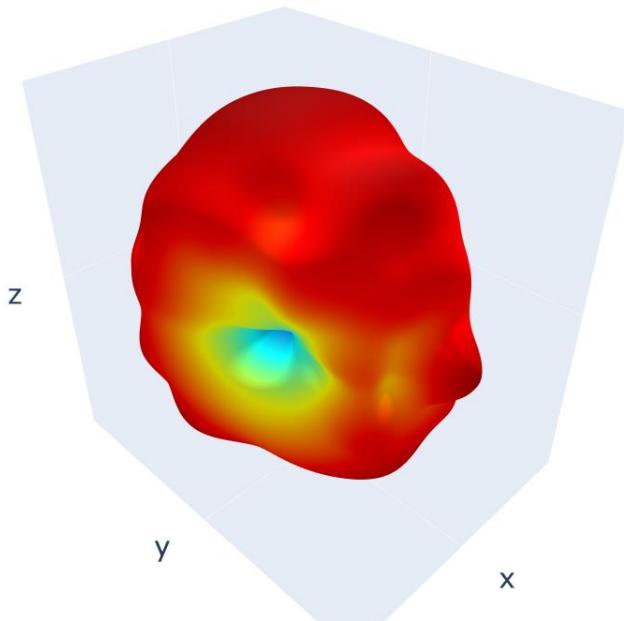
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Radiation Characteristics – 3D Pattern @ 2450 MHz



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Evaluation Board Outline & Matching Circuit

The evaluation board (Abracon P/N: AANI-NI-0013-EVB) is developed to showcase the performance of the Niche stamped metal antenna on a typical PCB and to simplify antenna testing and evaluation. It has a size of 50 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 C1 and C4-C6 component footprints are sized for 0402 (1005 metric) SMD components. The C2 and C3 component footprints are sized for 0201 (0603 metric) SMD components.

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

C1 = 0.4 pF (GJM1555C1HR40WB01)

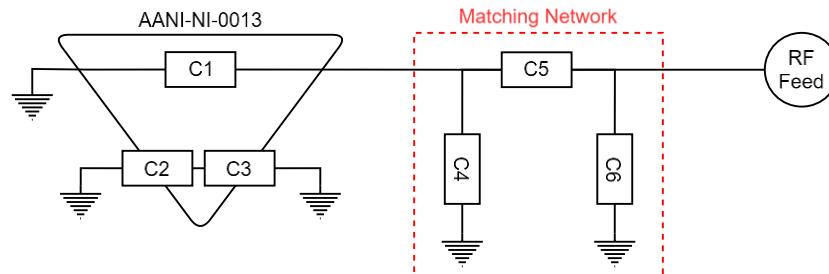
C4 = Not mounted

C2 = 0.7 pF (GJM0335C1HR70WB01)

C5 = Zero Ohm (KOA Speer RK73Z1ETTP)

C3 = 0.8 pF (GJM0335C1HR80WB01)

C6 = 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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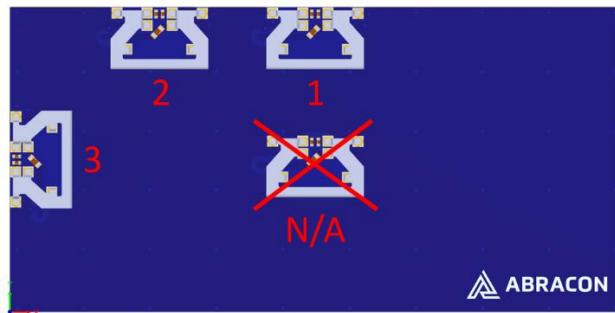
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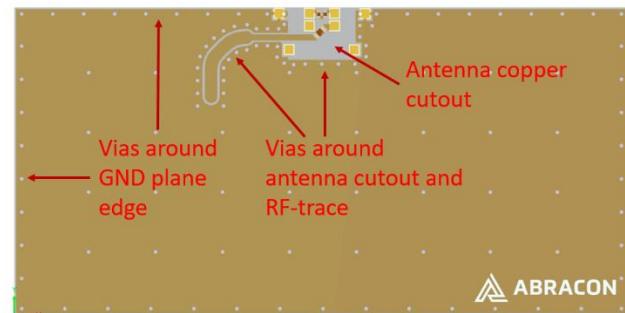
General Implementation Guidelines for the Niche Stamped Metal Antenna

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 (> 50 x 20 mm).

Antenna Positions:



Antenna cutout & via-structure:



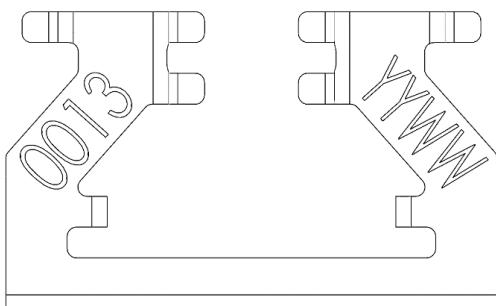
The rectangular copper cutout in the footprint needs to go through all the layers in the PCB stackup, meaning that there cannot be copper on any layer in this area. It is also recommended to have a good via-structure around the cutout and the edge of the ground plane, see the right image above.

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 shows great performance when potted compared to other antenna solutions and has also shown good performance in proximity of metal and other harsh antenna environments.

Part Marking

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



“YYWW” is the date code:

YY = Year

WW = Week

“0013” is the product ID ([AANI-NI-0013](#))

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Packaging Information

The evaluation kit consists of one complete evaluation board + three additional AANI-NI-0013 antennas.

One evaluation kit per Box

34 Boxes per Carton

Dimension of the Box: 15 x 10 x 4 cm

Dimension of the Carton: 43 x 34 x 19 cm

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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