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EZConnect™: Zigbee 868 MHz

APPLICATION NOTE
EZConnect™ (NN01-105)

EZConnect™ (NN01-105) – Zigbee 868 MHz

Ignion specializes in enabling effective mobile communications. Using Ignion technology, we design and manufacture optimized antennas to make your wireless devices more competitive. Our mission is to help our clients develop innovative products and accelerate their time to market through our expertise in antenna design, testing and manufacturing.

EZConnect™

NN01-105

Ignion is an ISO 9001:2015 certified company. All our antennas are lead-free and RoHS compliant.

ISO 9001:2015

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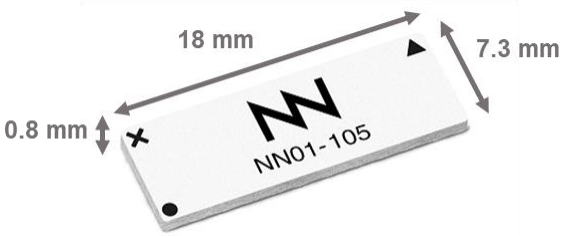
1. ANTENNA DESCRIPTION

The EZConnect™ antenna has been specifically designed for wireless devices using Zigbee, RFID and other wireless standards operating at the ISM 868/915 MHz bands.

EZConnect™ antenna uses the space-filling properties of Ignion technology to become one of the smallest antennas for ISM868/915 applications. Additionally, the antenna maintains a high radiation efficiency that helps to improve the battery life of your devices and features an omnidirectional radiation pattern optimal for highly scattered environments such as indoor environments and public spaces.

TOP



BOTTOM

Material: The EZConnect™ antenna is built on glass epoxy substrate.

APPLICATIONS

- Metering (Gas, Electricity, Water...)
- RFID (UHF Tags, Readers...)
- Sensors (Parking, Speed control, Optics...)
- Modules Zigbee
- Gateways

BENEFITS

- High efficiency and gain
- Small size
- Cost-effective
- Easy-to-use (pick and place)

2. QUICK REFERENCE GUIDE

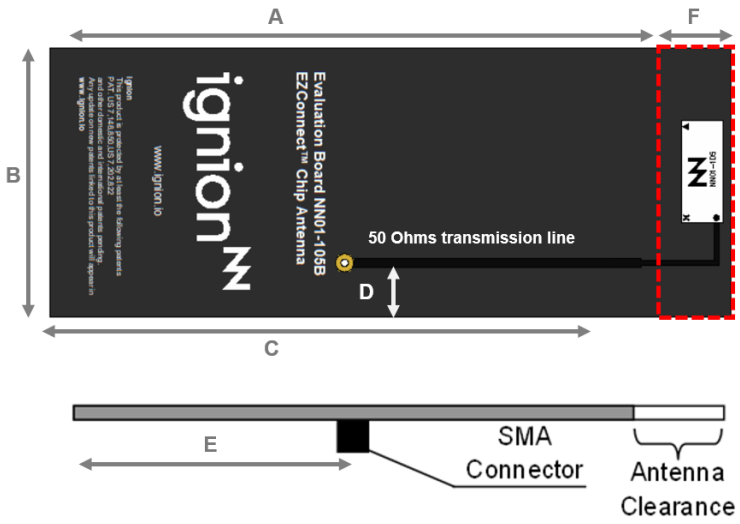
Technical features	868 MHz
Antenna Efficiency	78.1 %
Peak Gain	2.3 dBi
VSWR	< 2:1
Radiation Pattern	Omnidirectional
Polarization	Linear
Weight (approx.)	0.2 g
Temperature	-40 to +125 ºC
Impedance	50 Ω
Dimensions (L x W x H)	18.0 mm x 7.3 mm x 0.8 mm

Table 1 – Technical Features. Measures from the evaluation board. See chapters 3 and 4.

Please contact support@ignion.io if you require additional information on antenna integration or optimization on your PCB.

3. EVALUATION BOARD

868 MHz configuration for the EZConnect™ chip antenna used in the PCB Evaluation Board.



Measure	mm
A	105.0
B	48.0
C	121.0
D	9.5
E	53.1
F	16.0

Tolerance: ±0.2 mm

Material: The evaluation board is built on FR4 substrate. Thickness is 0.8 mm

Clearance Area: 48.0 mm x 16.0 mm (BxF)

Figure1 – EB_NN01-105B. EZConnect™ Evaluation Board at 868 MHz.

4. VSWR AND EFFICIENCY

VSWR (Voltage Standing Wave Ratio) and Efficiency versus Frequency (GHz).

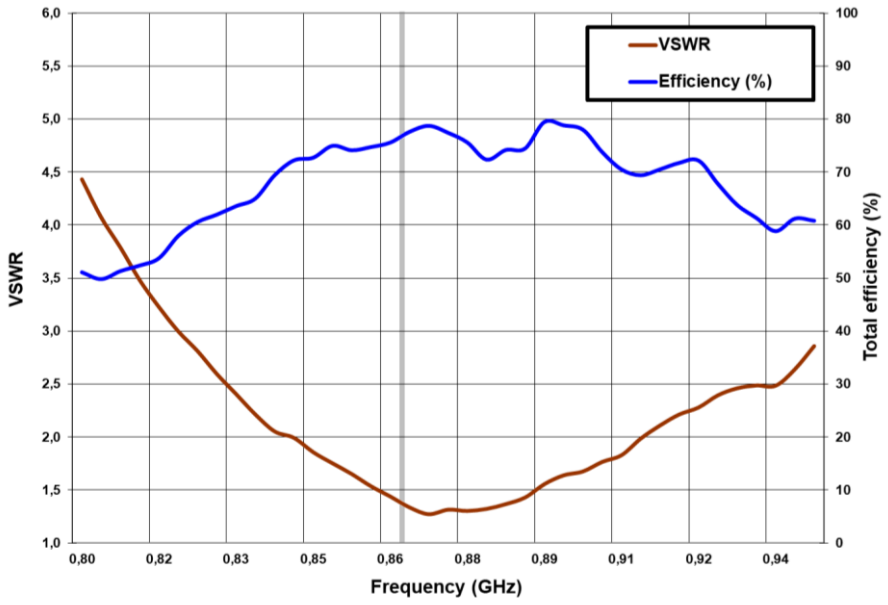
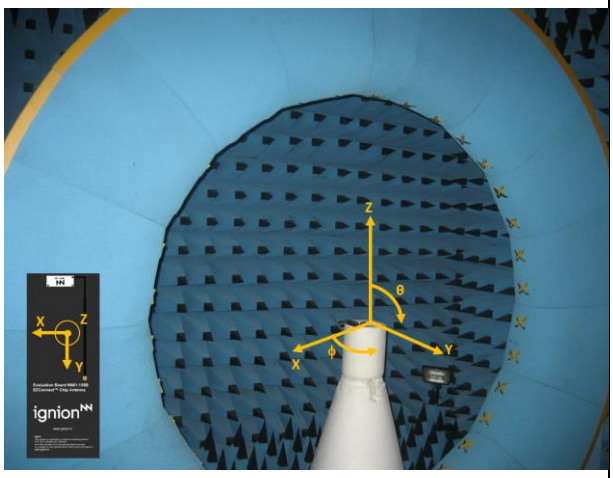
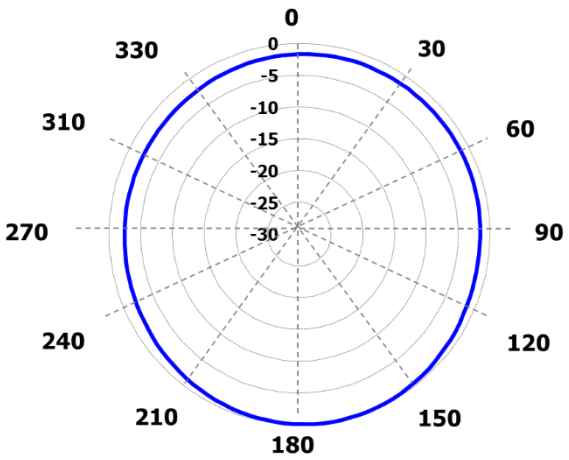


Figure 2 – Evaluation board at 868 MHz and graph of VWSR and Efficiency vs. Frequency (GHz)

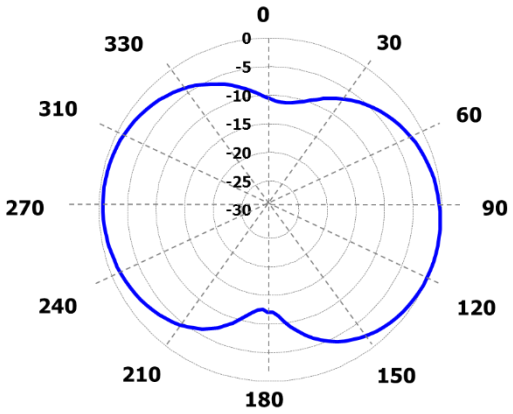
5. RADIATION PATTERNS (868 MHz), GAIN AND EFFICIENCY



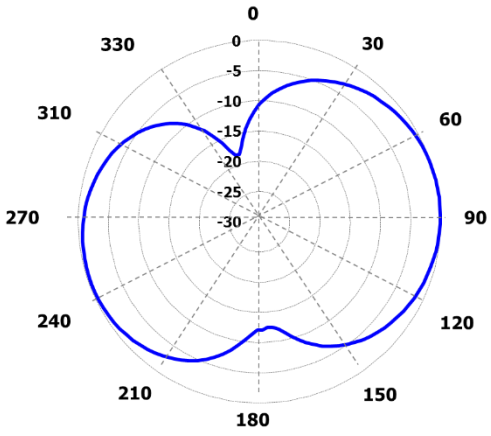
Orientation: Antenna in Plane ZY



Azimuth Cut θ = 90º Plane XY



Elevation Cut ϕ = 0º Plane XZ



Elevation Cut ϕ = 90º Plane YZ

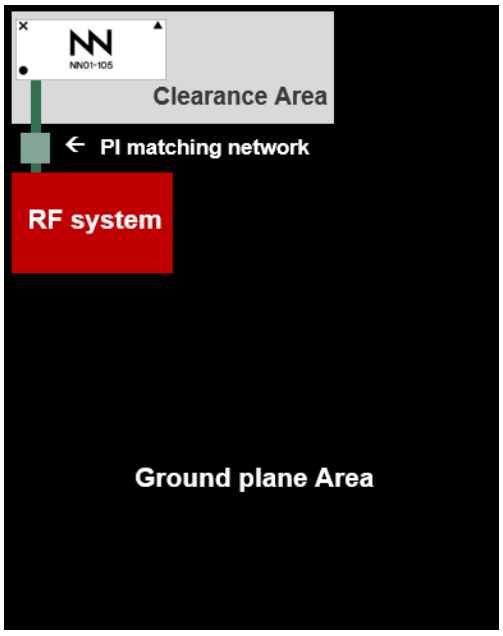
Gain	2.3 dBi
Efficiency	78.1 %

Table 2 – Antenna Gain and Efficiency at 868 MHz. Measures made in the evaluation board and in the Satimo STARGATE 32 anechoic chamber. Data across the band is not significant in this case because the bandwidth is very narrow (less than 1% or 8 MHz).

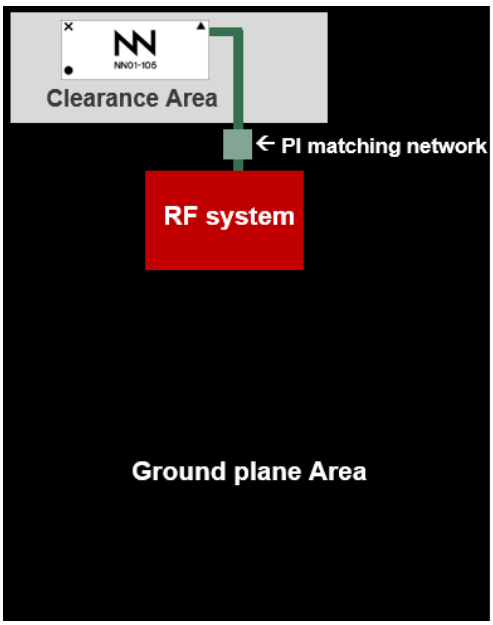
6. RECOMMENDED PCB LAYOUTS FOR A NEW DESIGN

The following examples describe the basics for a new design with the EZConnect™ antenna. Notice the importance of the ground plane area, clearance area, antenna location (in the PCB corner or in the edge) and the pads for a PI matching network (close to the antenna feeding point but in the ground plane area).

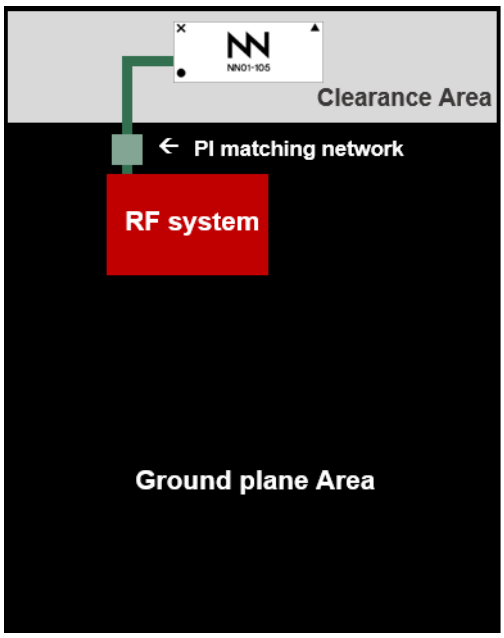
Example 1



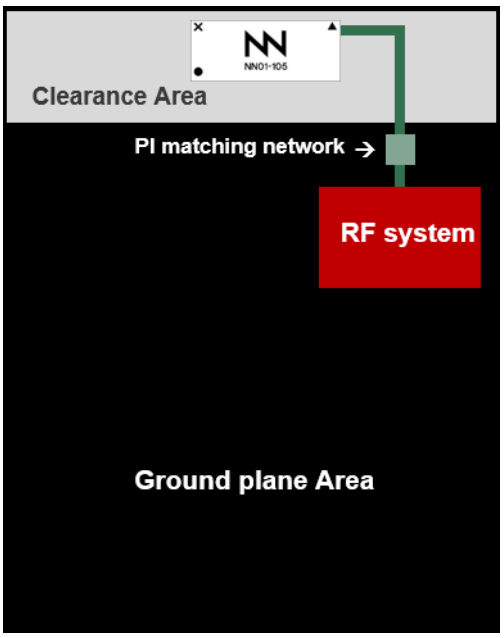
Example 2



Example 3



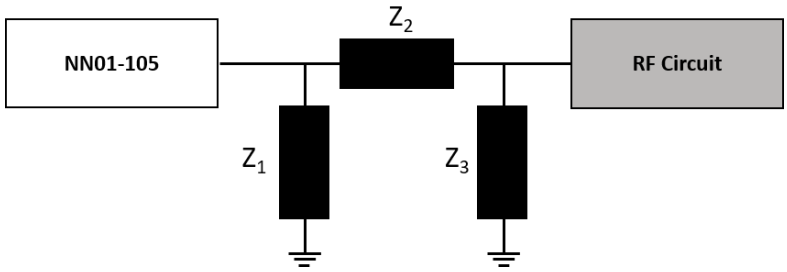
Example 4



7. MATCHING NETWORK

The specs of a Ignion standard antenna are measured in their evaluation board, which is an ideal case. In a real design, components nearby the antenna, LCD's, batteries, covers, connectors, etc. affect the antenna performance. This is the reason why it is highly recommended placing pads compatible with 0402 and 0603 SMD components for a PI matching network as close as possible to the antenna feeding point. Do it in the ground plane area, not in the clearance area. This is a degree of freedom to tune the antenna once the design is finished and taking into account all elements of the system (batteries, displays, covers, etc).

Please notice that different devices with different ground planes and different components nearby the EZConnect™ antenna may need a different matching network. To ensure optimal results, the use of high Q and tight tolerance components is highly recommended (Murata components). If you need assistance to design your matching network, please contact support@ignion.io, or try our free-of-charge[1] **NN Wireless Fast-Track** design service, you will get your chip antenna design including a custom matching network for your device in 24h[1]. Other related to NN's range of R&D services is available at: https://www.ignion.io/rdservices/



PI matching network example

Please contact support@ignion.io for more information related to the antenna matching service.

[1] See terms and conditions for a free NN Wireless Fast-Track service in 24h at: https://www.ignion.io/fast-track-project/

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