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RUN for ISM Band Wi Sun Protocols

APPLICATION NOTE
RUN mXTEND™ (NN02-224)

RUN mXTEND™ (NN02-224) – ISM 902-928 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.

RUN mXTEND™ antenna booster

NN02-224

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

ISO 9001: 2015

RoHS 2002/95/EC

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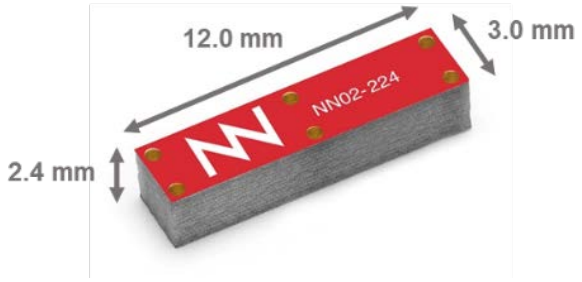
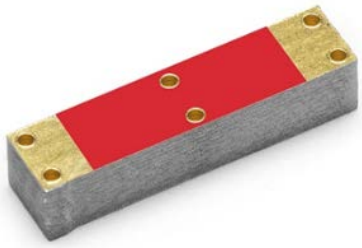
1. PRODUCT DESCRIPTION NN02-224

The RUN mXTEND™ antenna booster has been specifically designed for providing multiband performance in wireless devices (in particular in mobile devices), enabling worldwide coverage by allowing operation in the communication standards such as ISM868, ISM915, Zigbee, and RFID.

TOP



BOTTOM



Material: The RUN mXTEND™ antenna booster is built on glass epoxy substrate.

APPLICATIONS

- Handsets
- Smartphones
- Tablets
- Phablets
- Laptop PCs
- Netbooks
- Modules
- Routers
- eBook readers

BENEFITS

- High efficiency
- Small size
- Cost-effective
- Easy-to-use (pick and place)
- Multiband behaviour (worldwide standards)
- Off-the-Shelf Standard Product (no customization is required)

The RUN mXTEND™ antenna booster belongs to a new generation of antenna solutions based on the Virtual Antenna® technology developed by Ignion. The technology is mainly focused on replacing conventional antenna solutions by miniature and standard components.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement Nº 674491

2. Wi Sun Nic Board 902-928 MHz

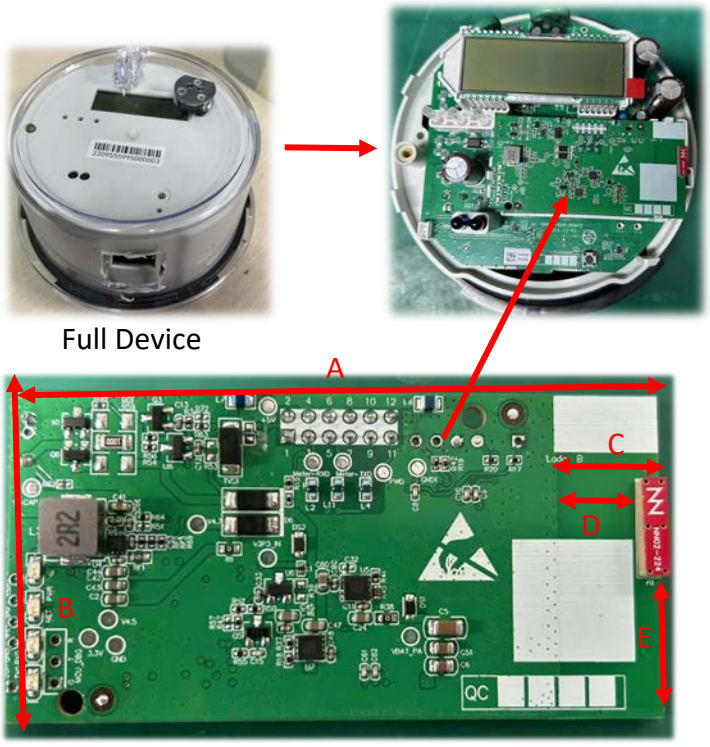
2.1. QUICK REFERENCE GUIDE

Technical features	902 – 928 MHz
Average Efficiency	> 25.8 %
Peak Gain	-1.26 dBi
VSWR	< 1.6:1
Radiation Pattern	Omnidirectional
Polarization	Linear
Weight (approx.)	0.19 g
Temperature	-40 to +125 ºC
Impedance	50 Ω
Dimensions (L x W x H)	12.0 mm x 3.0 mm x 2.4 mm

Table 1 – Technical Features. Measures from the Wi Sun Nic Board Full device. See Figure 1.

2.2. Wi Sun Nic Board

This antenna board was designed using the RUN mXTEND™ antenna booster. The RUN mXTEND™ provides operation in the frequency region which covers from 902 MHz to 928 MHz, through a single input/output port.



Measure	mm
A	80
B	40
C	12.6
D	9.6
E	17.0

Tolerance: ±0.2 mm

D: Distance between the RUN mXTEND™ antenna booster and the ground plane.

Material: The evaluation board is built on FR4 substrate. Thickness is 1.6 mm.

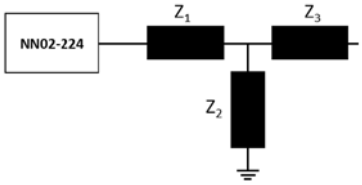
Clearance Area: 12.6 mm x 40 mm (C x B)

Figure 1 – Wi Sun Nic Board Full Device, providing operation from 902 MHz to 928 MHz

2.3. MATCHING NETWORK

The specs of a Ignion standard product are measured in the Wi Sun Nic Board Full Device, In this design, components nearby the antenna, LCD's, batteries, covers, connectors, etc, will affect the antenna performance.

902 – 928 MHz



Z	Value	Part Number
Z1	6.8nH	LQW15AN6N8G80
Z2	4.9nH	LQW15AN4N9B80
Z3	0R	0603WAF0000T5E

Figure 2 – Matching Network implemented in the Wi Sun Nic Board Full Device (Figure 1)

For additional information, please visit www.ignion.io or contact info@ignion.io.

If you need assistance to design your matching network, please contact support@ignion.io, or try our free-of-charge[1] Antenna Intelligence Cloud design service, which will get you a chip antenna design including a custom matching network for your device in 24h[1]. Other information related to Ingion's range of R&D services is available at: https://www.ignion.io/rdservices/

2.4. VSWR AND TOTAL EFFICIENCY

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

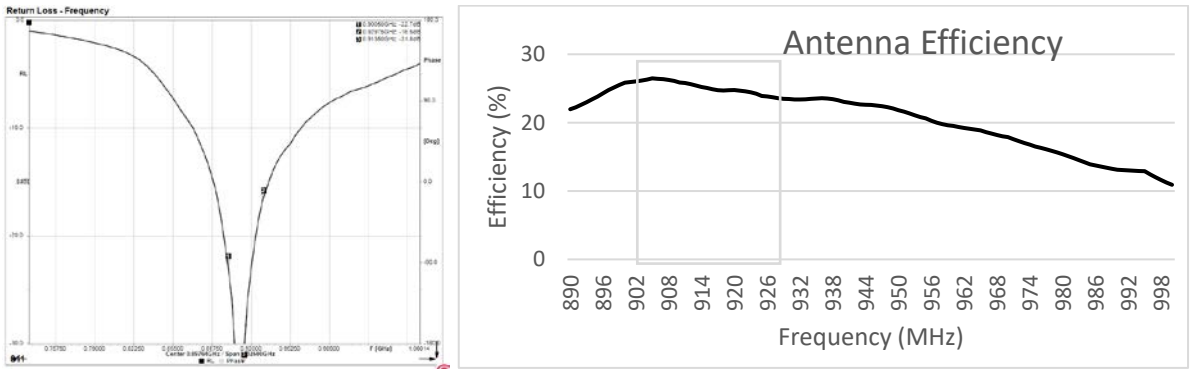
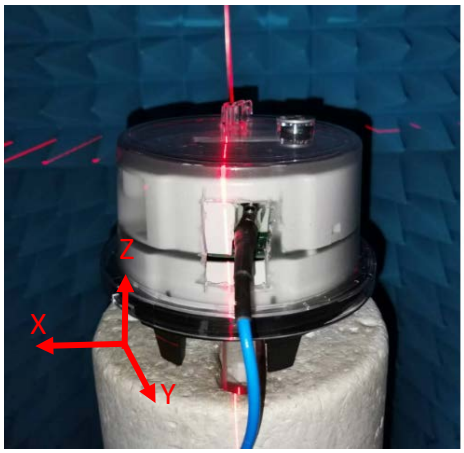


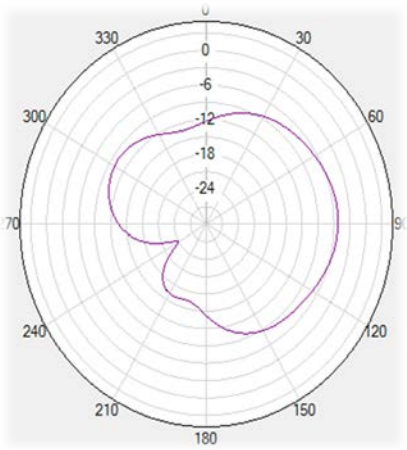
Figure 3 – VSWR and Total Efficiency for the 902 – 928 MHz from the Wi Sun Nic Board Full Device (Figure 1)

[1] See terms and conditions for a free Antenna Intelligence Cloud service in 24h at: https://www.ignion.io/antenna-intelligence/

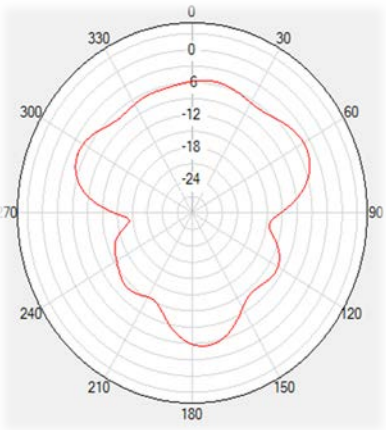
2.5. RADIATION PATTERNS (902-928 MHz), GAIN AND EFFICIENCY



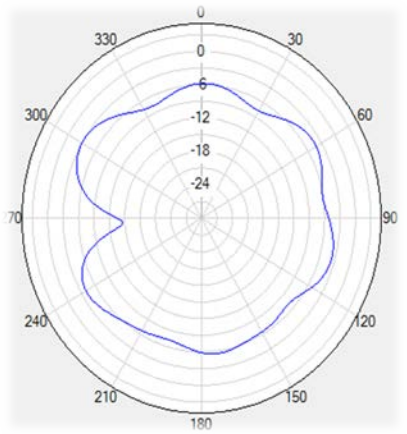
Measurement System Set-Up Wi Sun Nic Board Full Device in Plane XY



θ = 90º Plane XY at 915 MHz



ϕ = 0º Plane XZ at 915 MHz



ϕ = 90º Plane YZ at 915 MHz

Gain	**Peak Gain**	-1.26 dBi
	Average Gain across the band	-1.46 dBi
	Gain Range across the band (min, max)	-1.66 **<–>** -1.26 dBi
Efficiency	**Peak Efficiency**	27.5 %
	Average Efficiency across the band	25.8 %
	Efficiency Range across the band (min, max)	24.1 – 27.5 %

Table 2 – Antenna Gain and Total Efficiency from the Wi Sun Nic Board Full Device (Figure 1) within the 902 – 928 MHz frequency range.

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