

915/868 MHZ: LPWA/ISM MULTIBAND CHIP ANTENNA



ACR1504I3

Request Samples



Check Inventory



15 x 4 x 1.2 mm

RoHS/RoHS II Compliant

MSL Level = N/A

Features

- Multiband Coverage
- LPWA/ISM 868 / 915 MHz
- Omni-directional Pattern
- Uniform Gain at 868 & 915 MHz
- High Efficiency Up to 60%
- Versatile Surface Mount Options

Applications

- LPWA/LoRa/SigFox applications
- BT/BLE/Matter/Thread
- Intelligent Lighting
- Smart Metering Solutions
- Smart Irrigation Systems
- Home Automation and Fire Prevention
- Agriculture/Environment Sensing

Product Image



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Electrical Specification

Parameter		Specification		Unit
Operating Frequency		868	915	MHz
VSWR		< 2.0		
Polarization		Linear		-
Peak Gain	Vertical Placement	0.9	1.6	dBi
	Horizontal Placement	0.5	1.0	
Efficiency	Vertical Placement	58	60	%
	Horizontal Placement	56	58	
Impedance		50		Ω

Note: All measurements were conducted on the evaluation board in free space. Performance will vary depending on the size and shape of the ground plane, PCB layout as well as nearby components.

Mechanical Specification

Parameter	Specification
Antenna Dimension	15 x 4 x 1.2 mm
Evaluation board Dimension	105 x 35 mm
Recommended Ground Clearance for Antenna	35 x 20 mm (Vertical Placement) 35 x 15 mm (Horizontal Placement)
Mounting Type	Surface Mount
Material(s)	Ceramic

Environmental Specification

Parameters	Specifications
Operating Temperature	-40°C ~ +85°C
Storage Temperature	0 °C to +40 °C
RoHS Compliance	Yes



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Ordering Information

Part Number	Description
ACR1504I3	915/868 MHz LPWA/ISM MULTIBAND CHIP ANTENNA
ACR1504I3-EVB	915/868 MHz LPWA/ISM MULTIBAND CHIP ANTENNA Evaluation Board

Note: Different cable and connector configurations that are not listed may be available upon request via [Abracon online support](#)

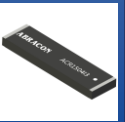


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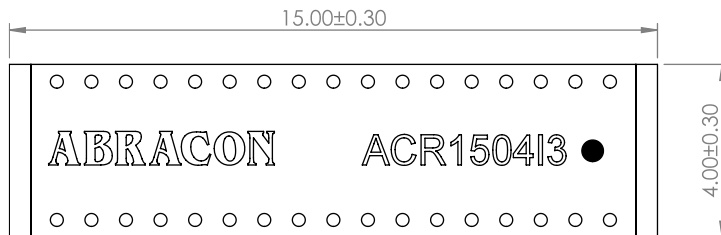


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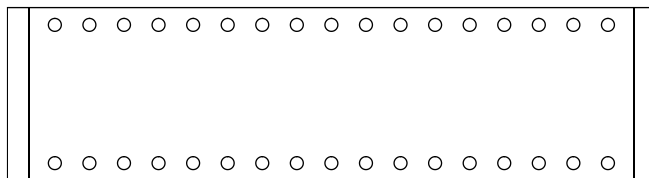
Product Dimensions



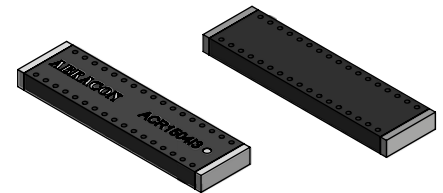
TOP VIEW



FRONT VIEW



BOTTOM VIEW



Unit: mm



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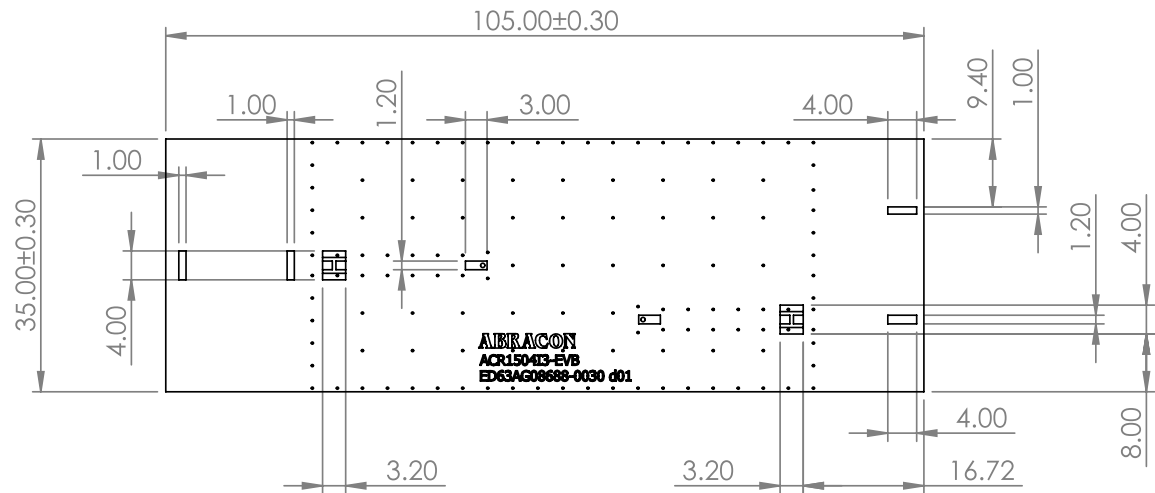


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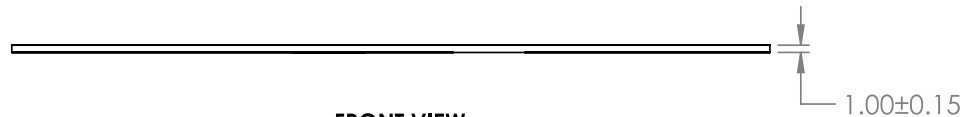
RoHS/RoHS II Compliant

MSL Level = N/A

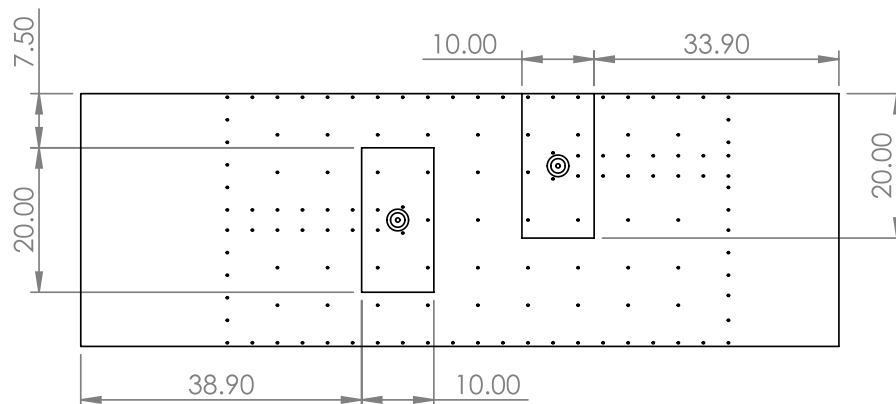
Evaluation Board Dimensions



TOP VIEW



FRONT VIEW



Unit: mm



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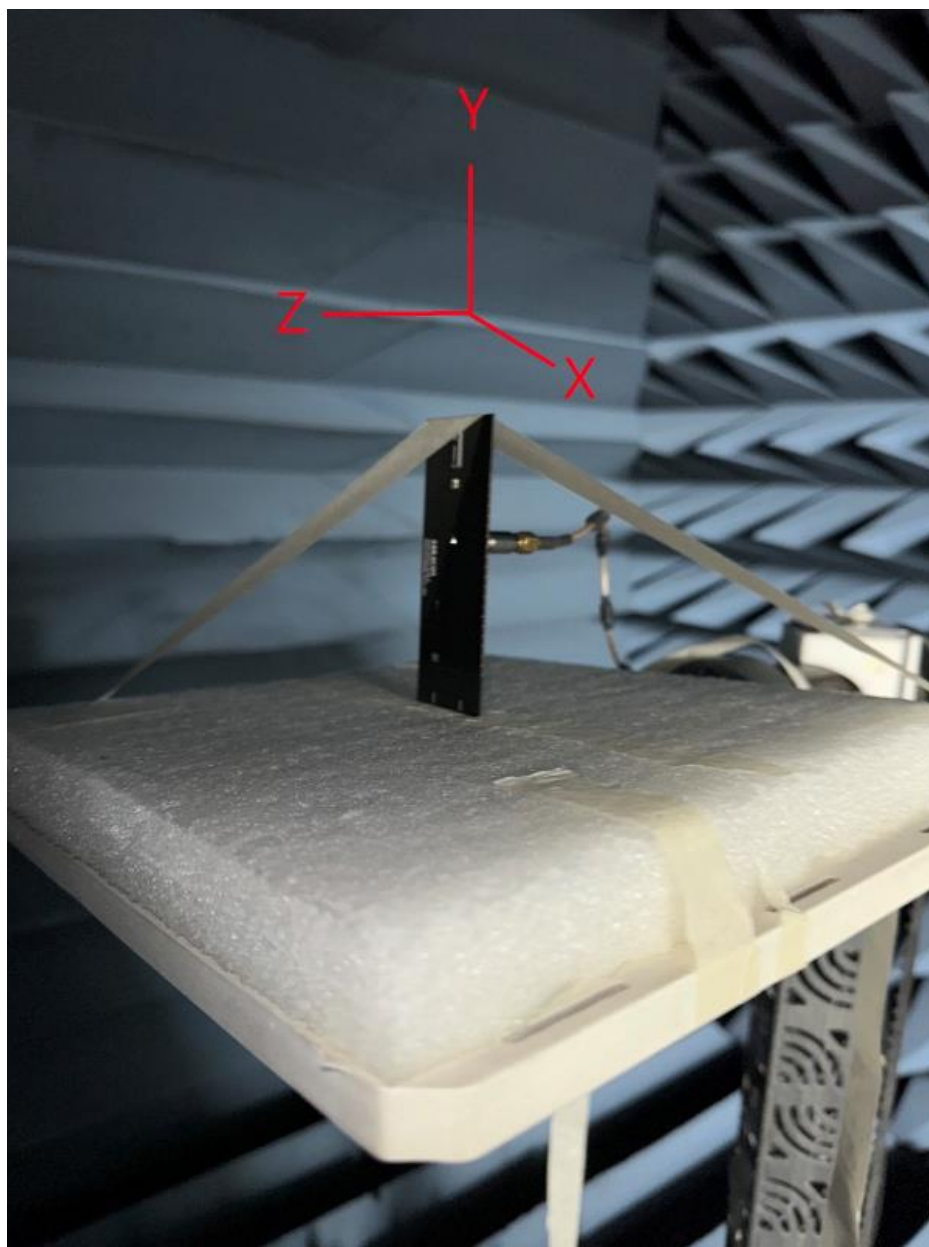


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MSL Level = N/A

Measurement Setup



915/868 MHZ: LPWA/ISM MULTIBAND CHIP ANTENNA



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Transmission Line

All transmission lines should be designed to have a characteristic impedance of 50Ω .

- The length of the transmission lines should be kept to a minimum
- Any other parts of the RF system like transceivers, power amplifiers, etc., should also be designed to have an impedance of 50Ω

Once the material for the PCB has been chosen (PCB thickness and dielectric constant), a coplanar transmission line can easily be designed using any of the commercial software packages for transmission line design. For the chosen PCB thickness, copper thickness and substrate dielectric constant, the program will calculate the appropriate transmission line width and gaps on either side of the track, so the characteristic impedance of the co-planar transmission is 50Ω .

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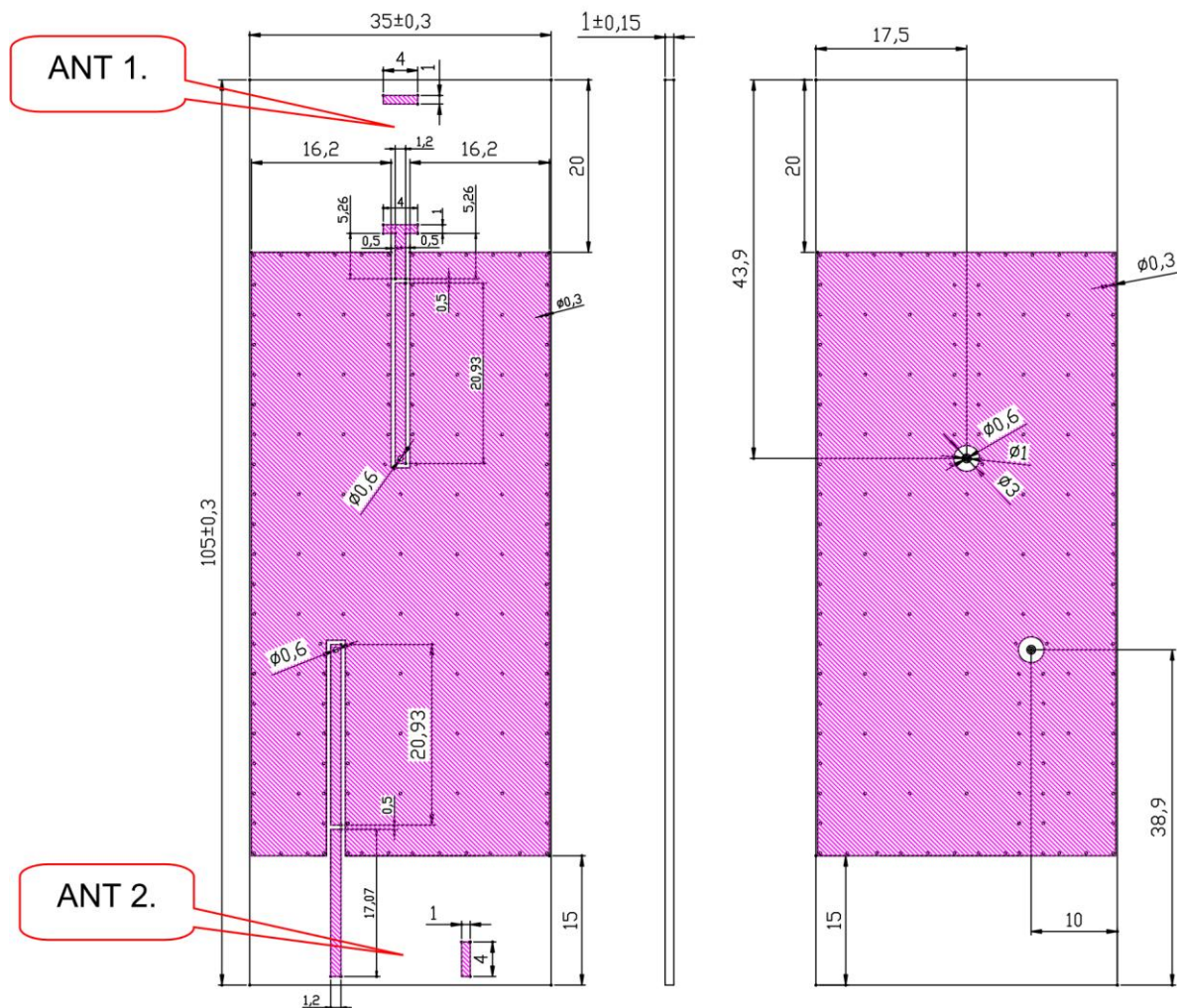
15 x 4 x 1.2 mm

RoHS/RoHS II Compliant

MSL Level = N/A

Evaluation Board Outline & Matching Circuit

The evaluation board is developed to simplify antenna testing and evaluation. It has an arbitrary ground plane size of 105 x 35 mm and includes an SMA connector. The purpose is to give a reference design for an optimal antenna implementation. The evaluation board can also be used to test other implementations by cutting and soldering the PCB into any device.



Unit: mm

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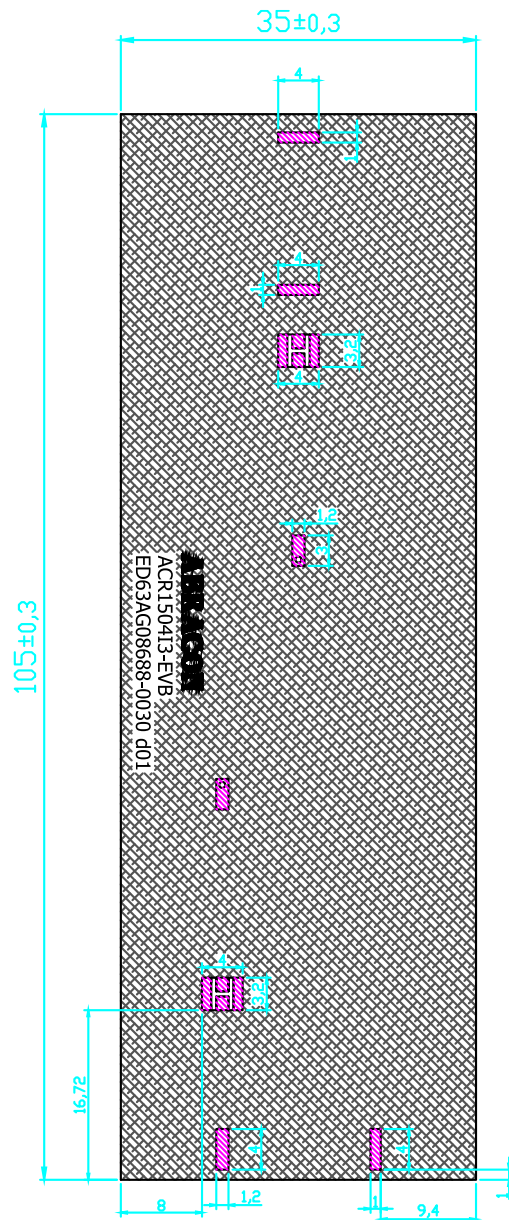
Check Inventory



15 x 4 x 1.2 mm

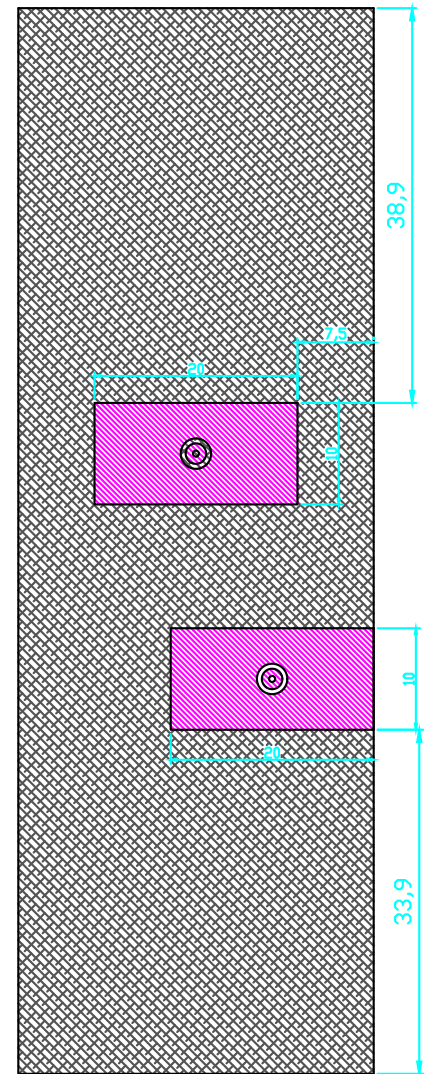
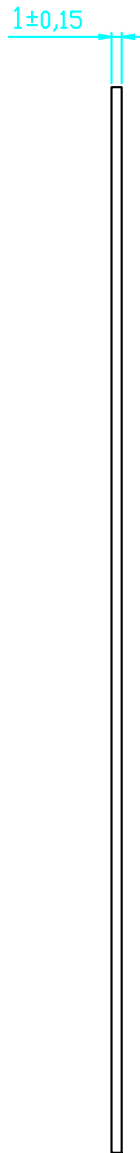
RoHS/RoHS II Compliant

MSL Level = N/A



COVER AREA
SOLDER AREA

TOP



COVER AREA
SOLDER AREA

BOTTOM

Unit: mm

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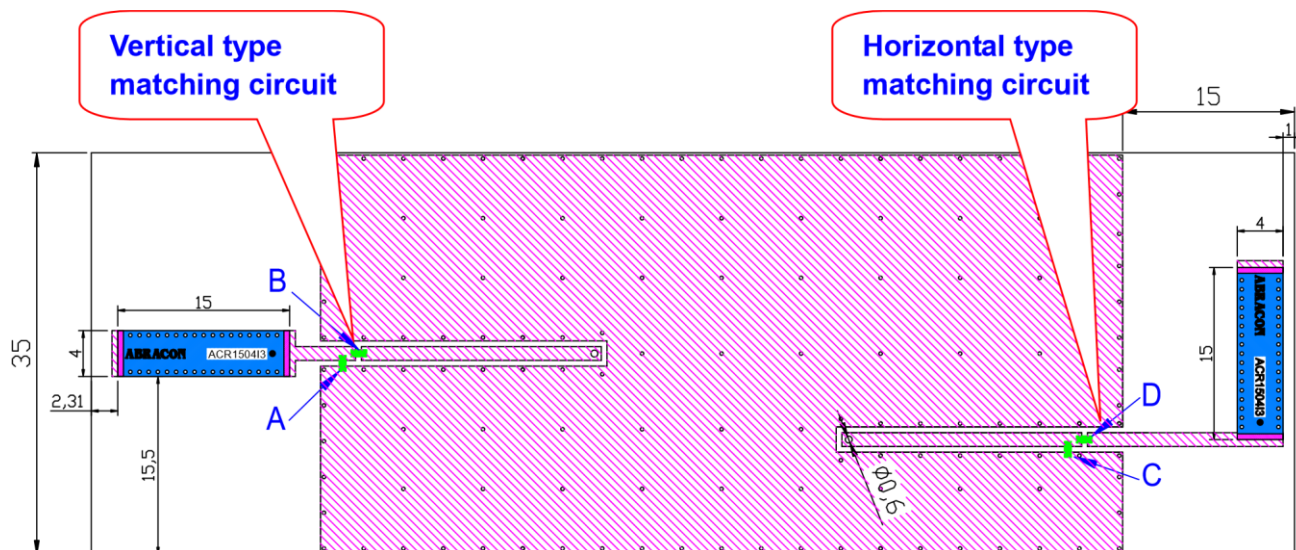


15 x 4 x 1.2 mm

RoHS/RoHS II Compliant

MSL Level = N/A

The land pattern for soldering (black marking areas) is as shown below. Matching circuit is needed for good performance, when customer's device is different.



Unit: mm

Location		868MHz	915MHz
		Description	
Vertical type	A	12 nH	0.5 pF
	B	33 nH	5.6 pF
Horizontal type	C	6.8 nH	N/A*
	D	4.7 pF	1.5 pF

*Typical reference values which may need to be changed when circuit boards or part vendors are different.



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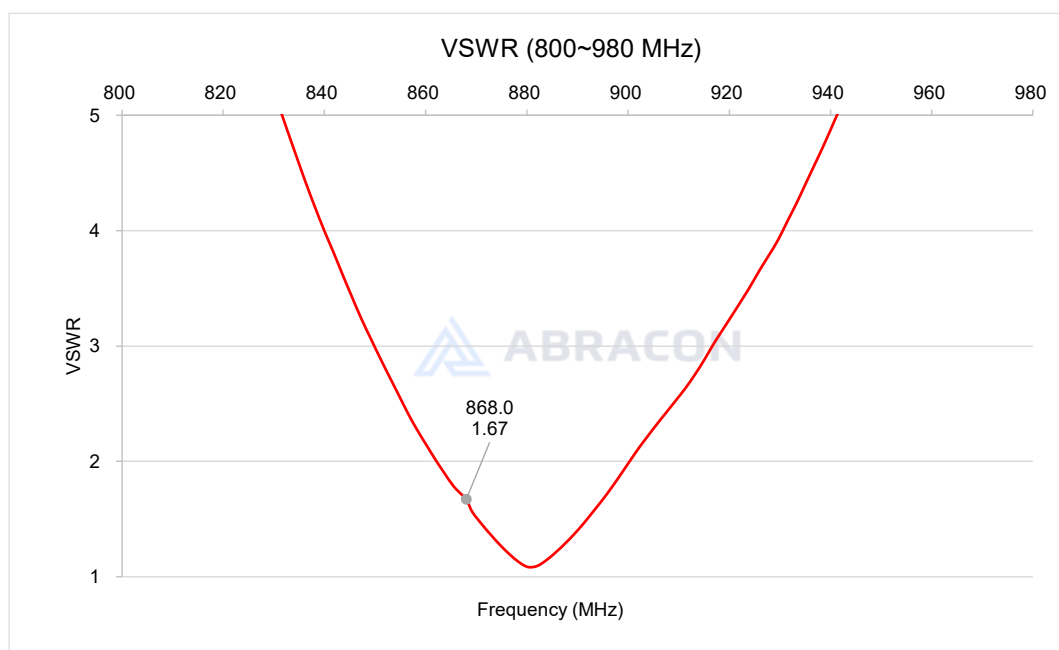
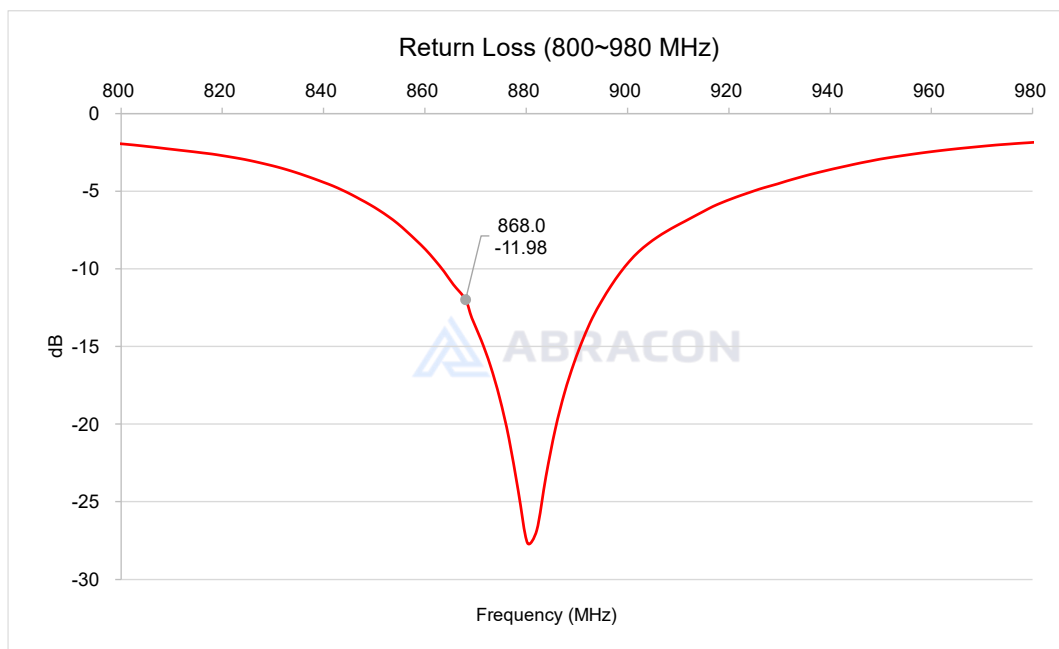
15 x 4 x 1.2 mm

RoHS/RoHS II Compliant

MSL Level = N/A

Reflection Characteristics – Return Loss & VSWR (Vertical Placement)

868MHz



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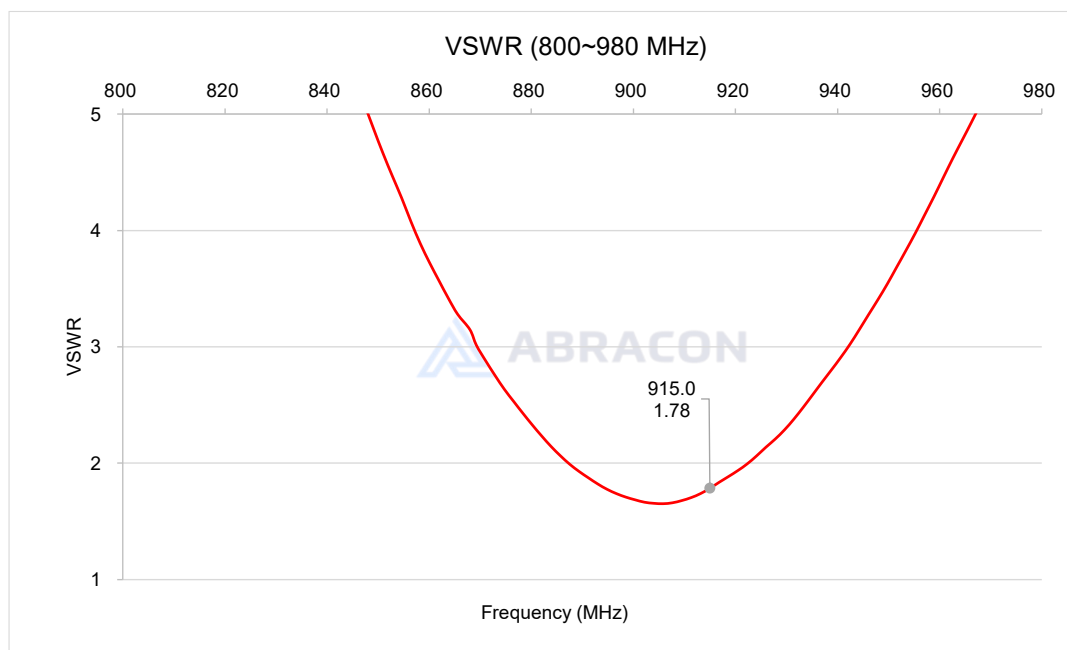
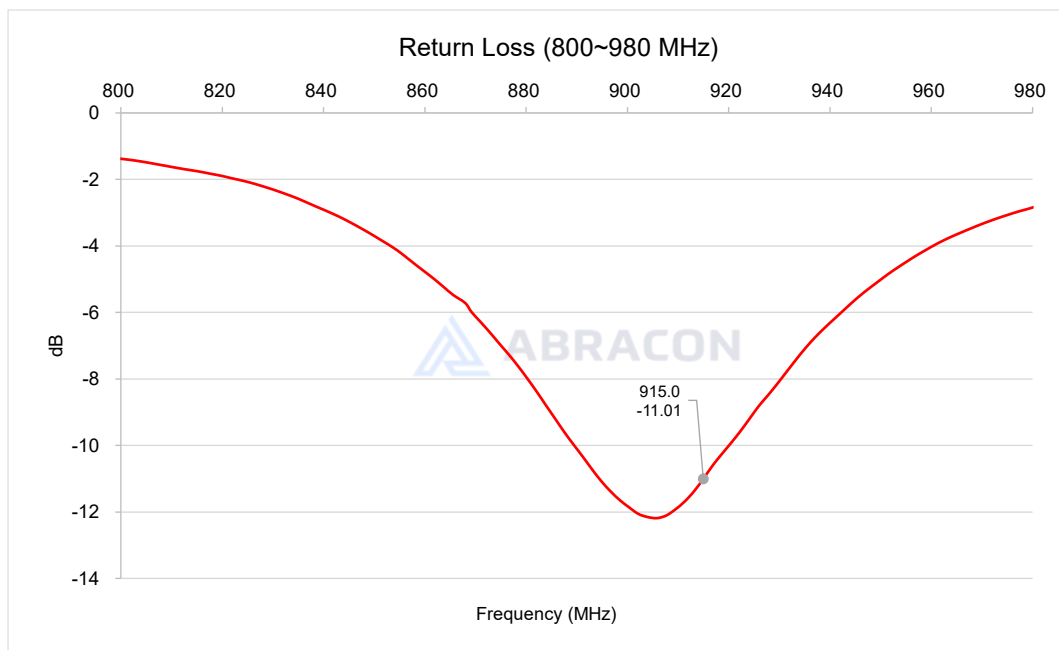


15 x 4 x 1.2 mm

RoHS/RoHS II Compliant

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915MHz



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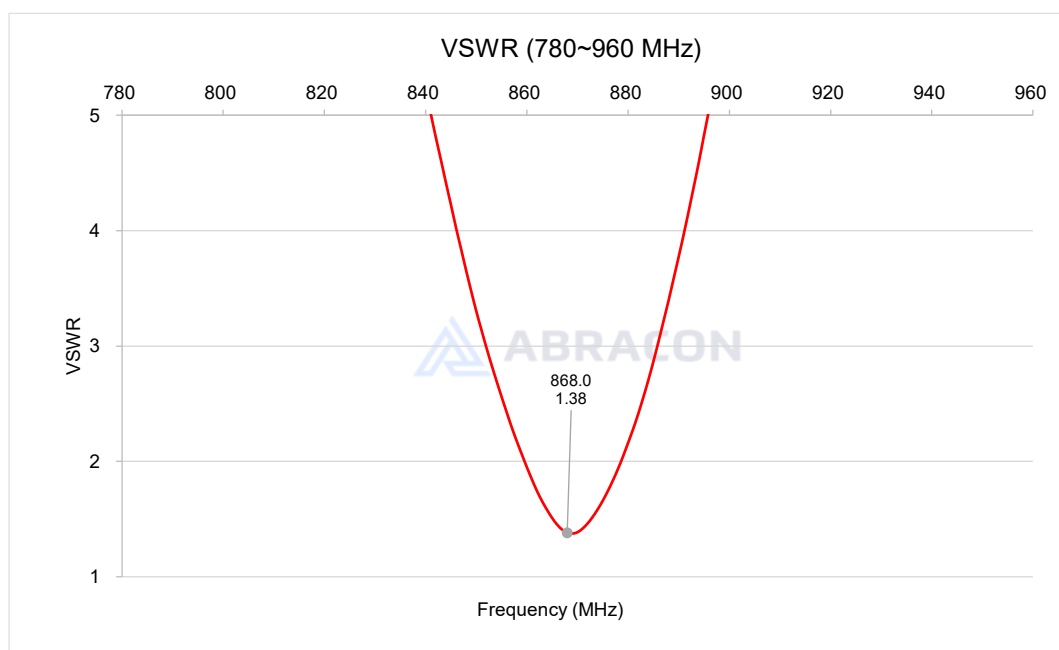
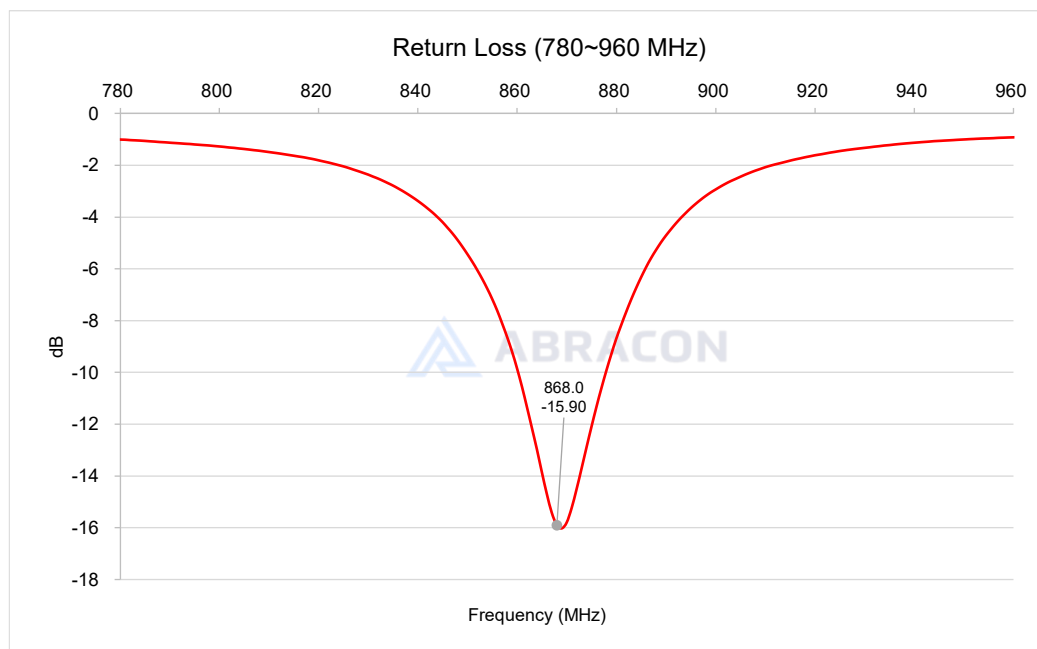
15 x 4 x 1.2 mm

RoHS/RoHS II Compliant

MSL Level = N/A

Reflection Characteristics – Return Loss & VSWR (Horizontal Placement)

868MHz



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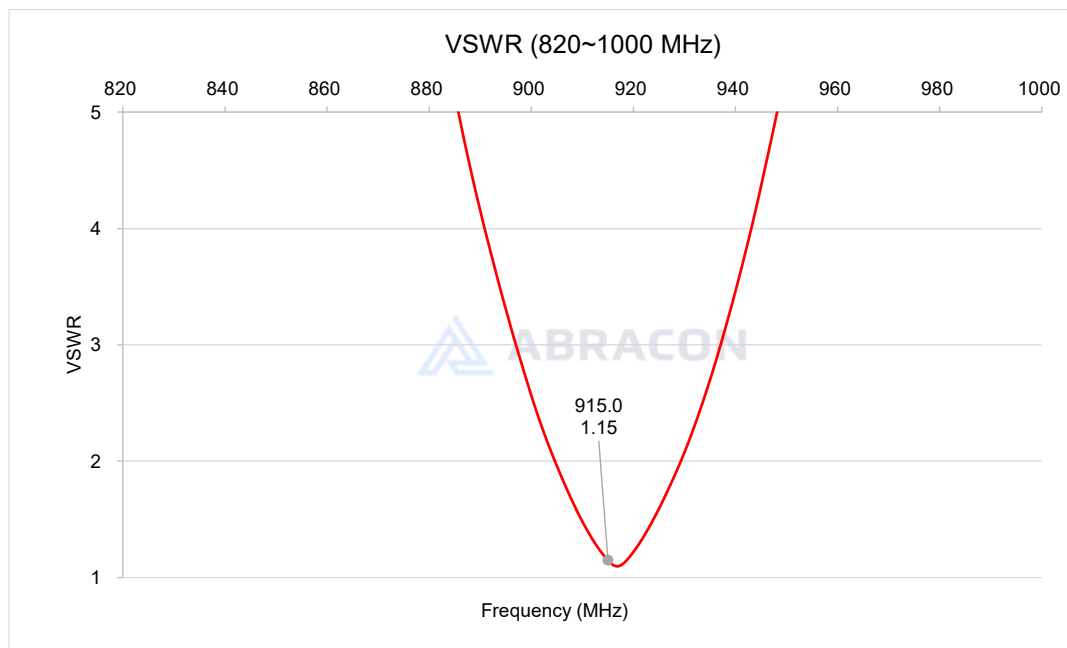
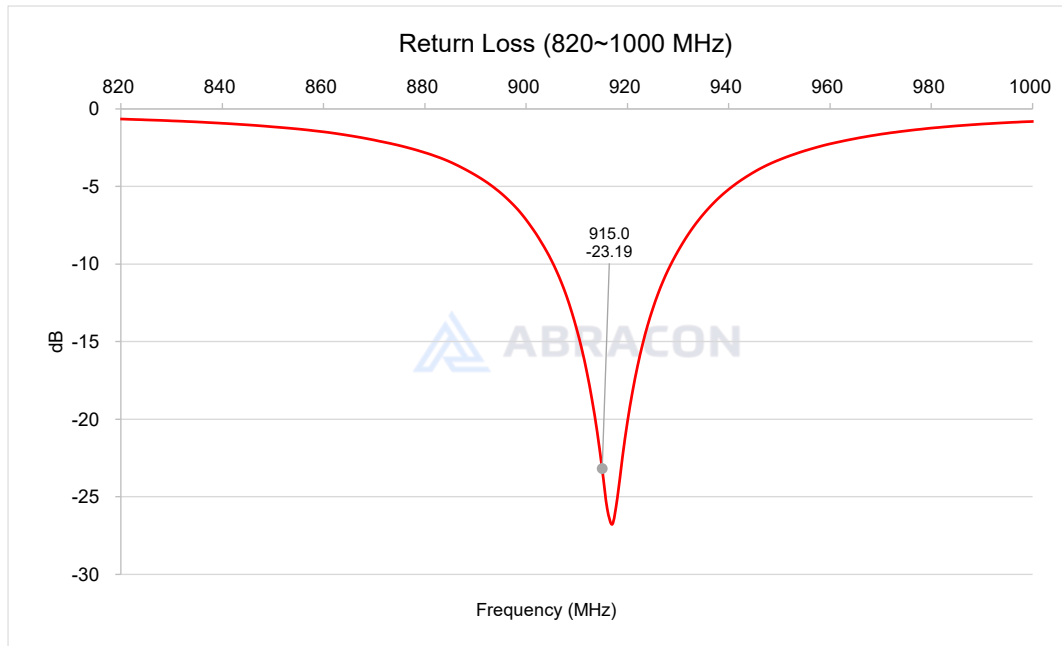


15 x 4 x 1.2 mm

RoHS/RoHS II Compliant

MSL Level = N/A

915MHz



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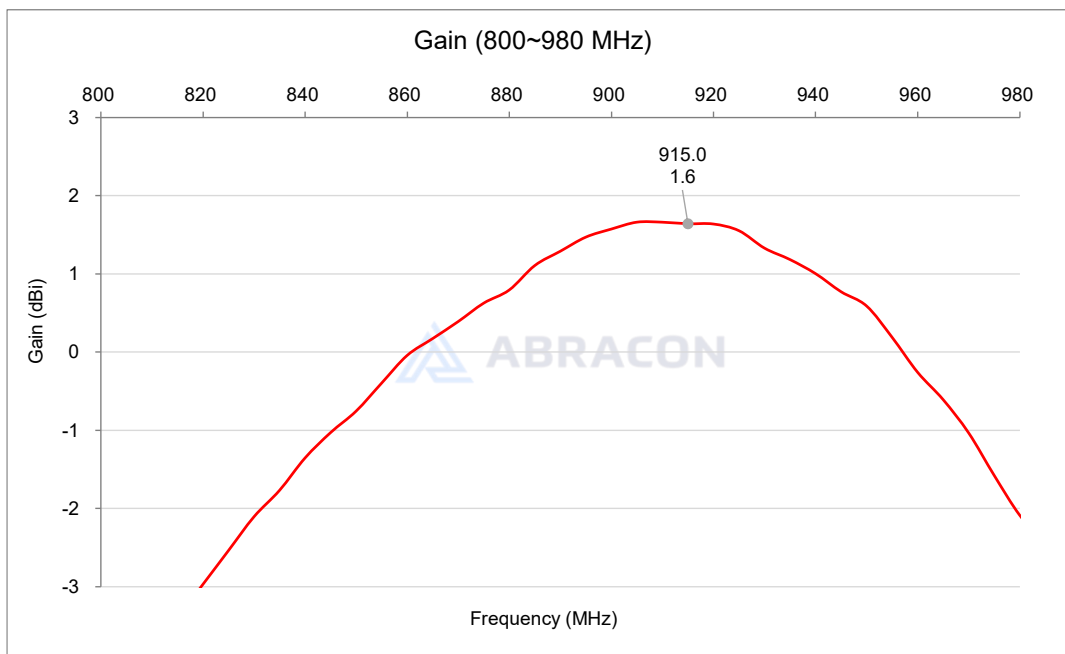
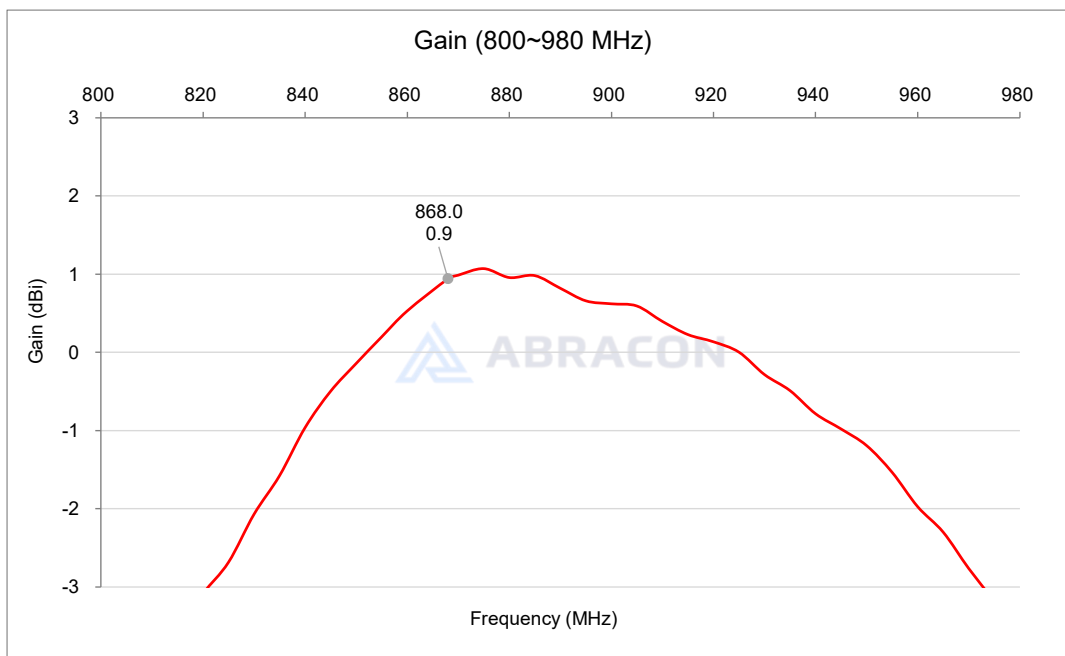


15 x 4 x 1.2 mm

RoHS/RoHS II Compliant

MSL Level = N/A

Radiation Characteristics –Peak Gain (Vertical Placement)



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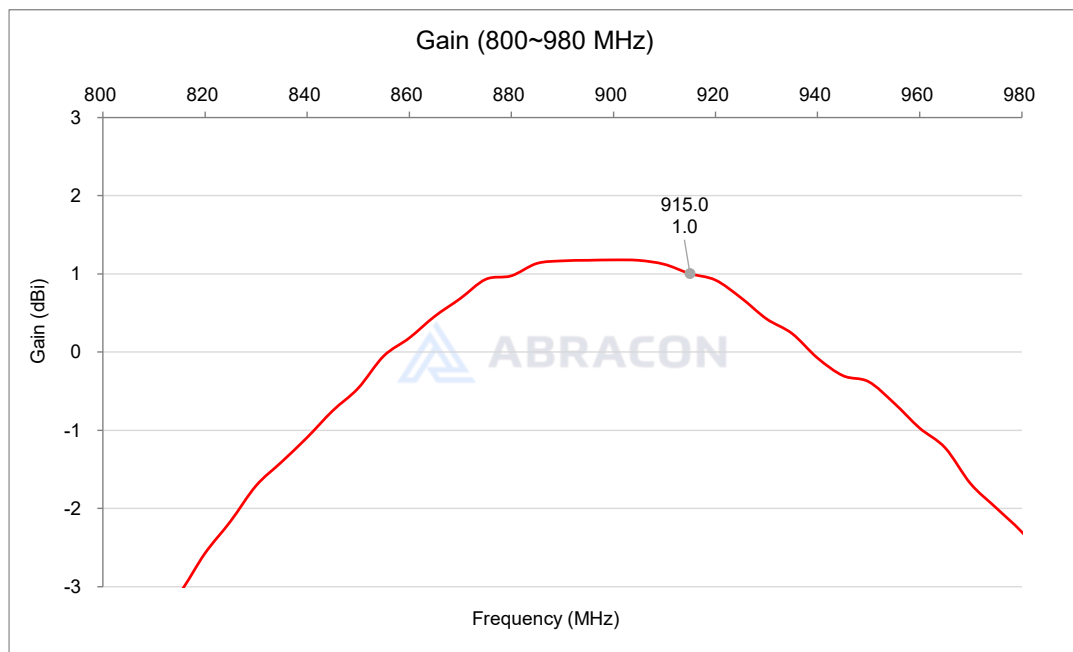
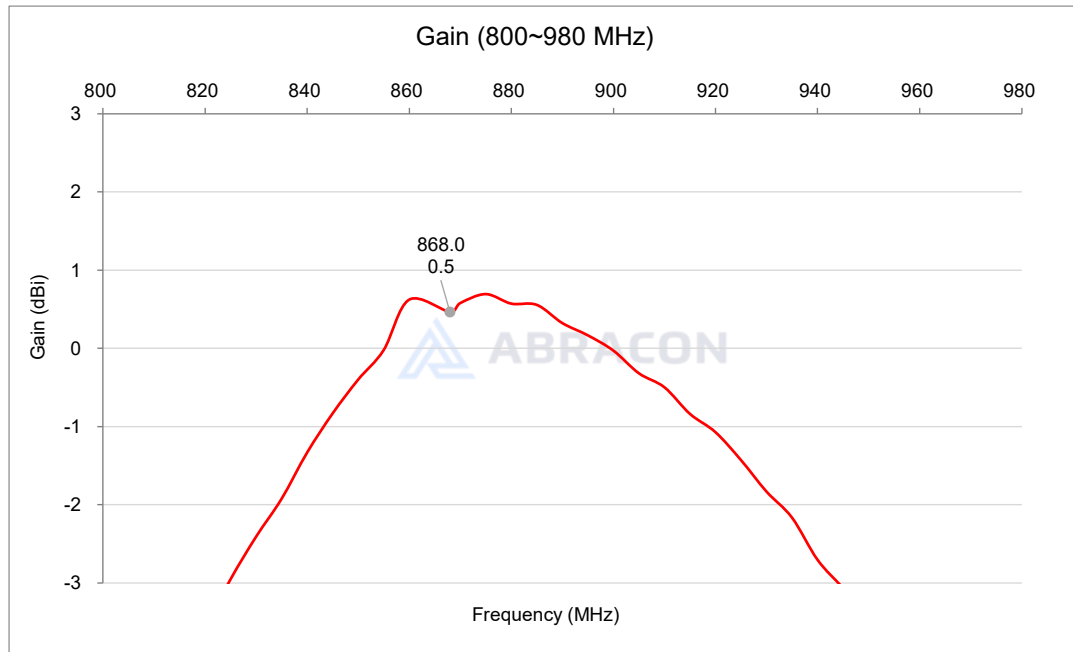


15 x 4 x 1.2 mm

RoHS/RoHS II Compliant

MSL Level = N/A

Radiation Characteristics –Peak Gain (Horizontal Placement)



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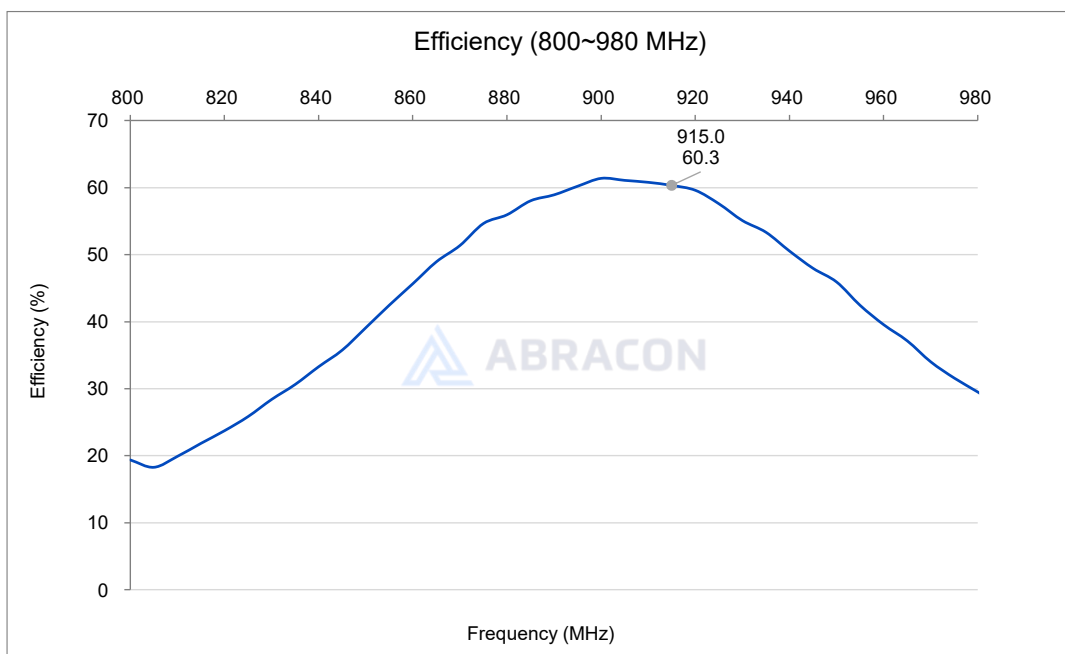
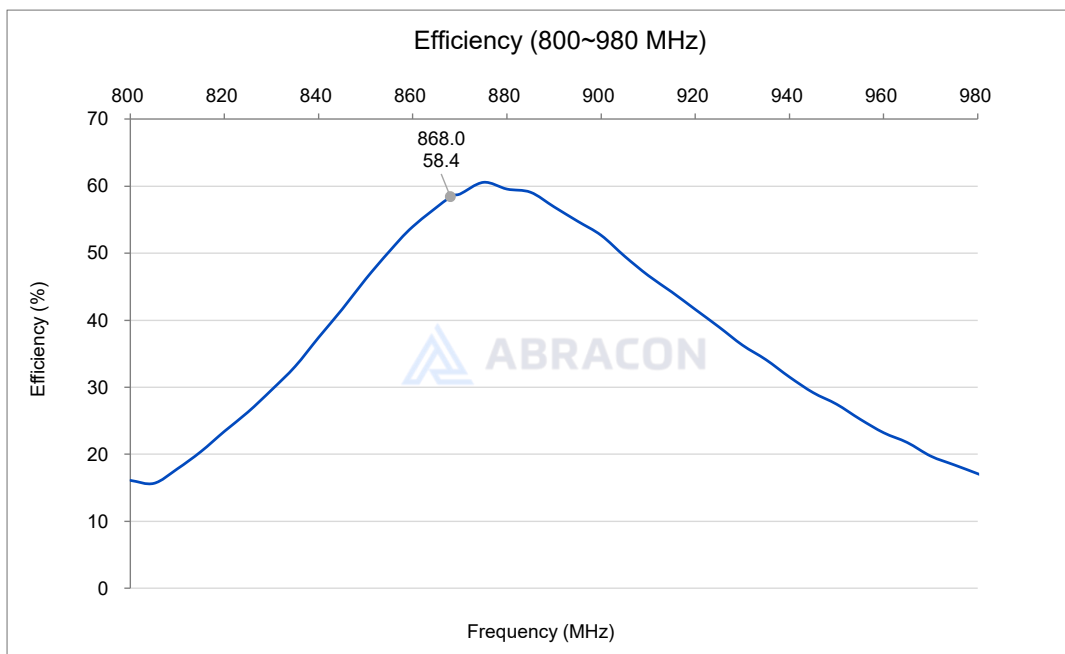


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RoHS/RoHS II Compliant

MSL Level = N/A

Radiation Characteristics – Total Efficiency (Vertical Placement)



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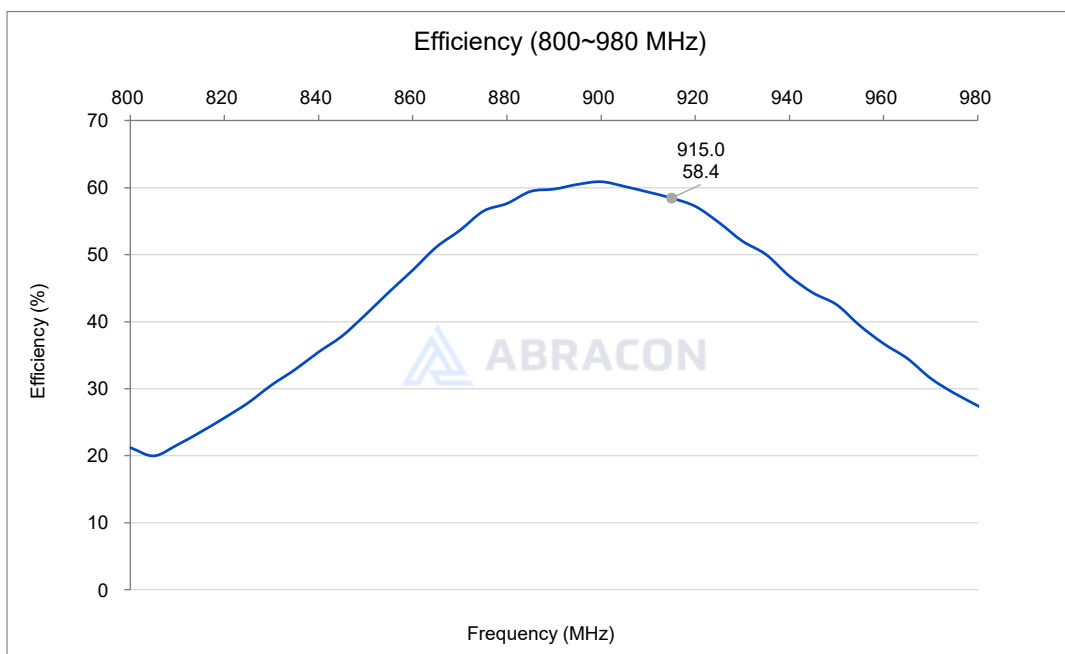
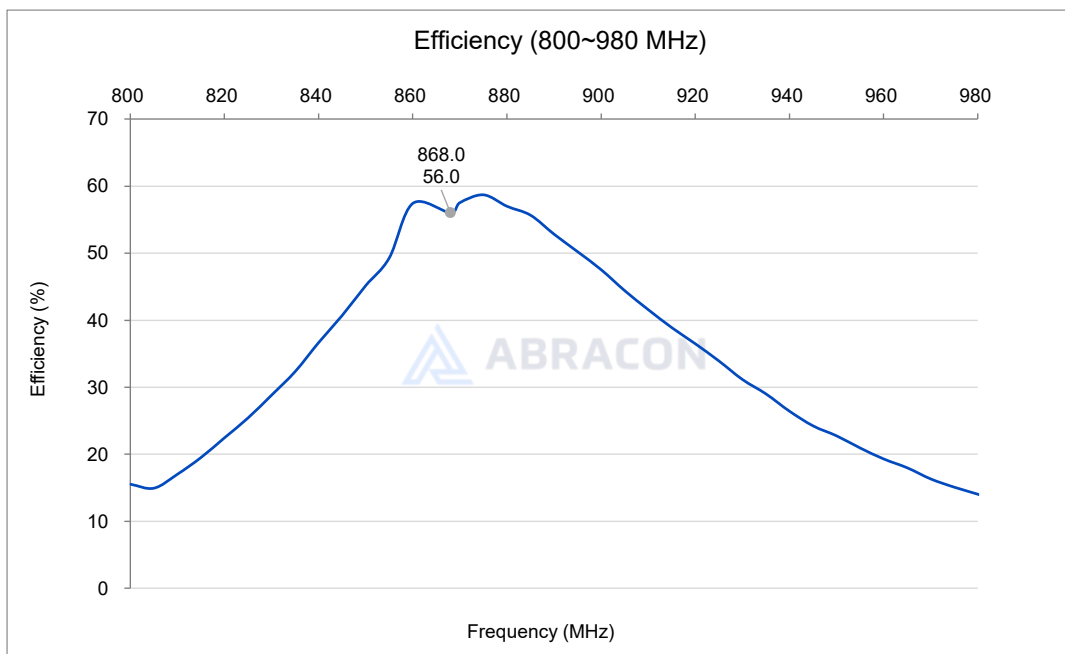


15 x 4 x 1.2 mm

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MSL Level = N/A

Radiation Characteristics – Total Efficiency (Horizontal Placement)



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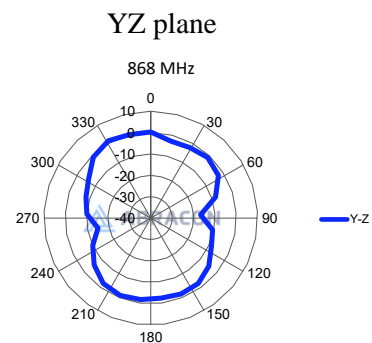
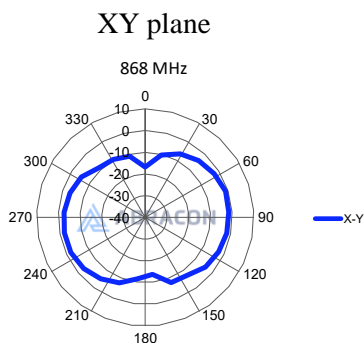
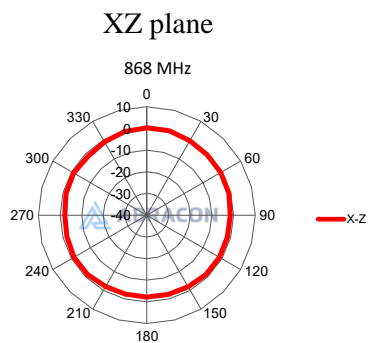
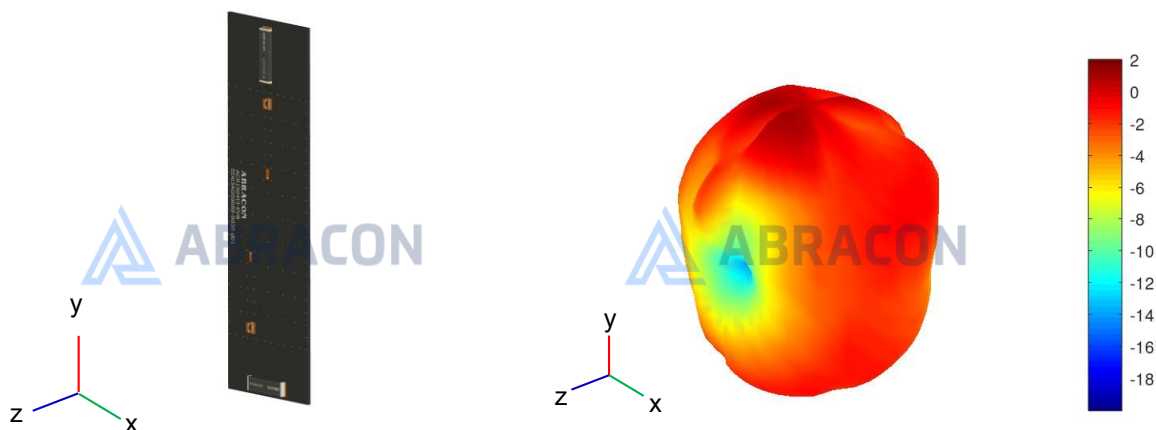
15 x 4 x 1.2 mm

RoHS/RoHS II Compliant

MSL Level = N/A

Radiation Characteristics – 2D & 3D Pattern

868MHz (Vertical Placement)

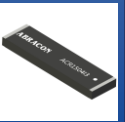


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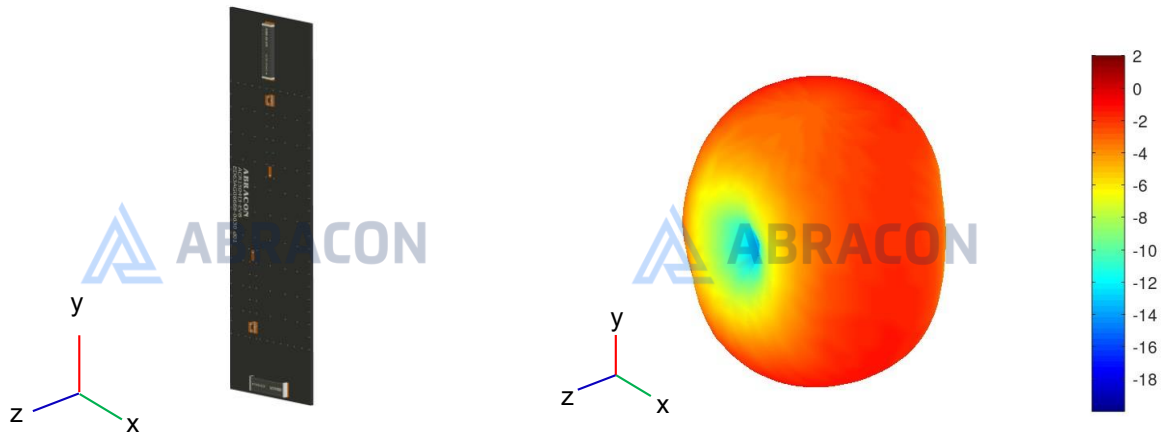


15 x 4 x 1.2 mm

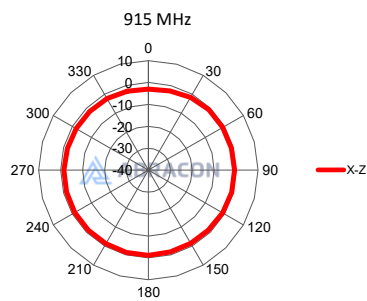
RoHS/RoHS II Compliant

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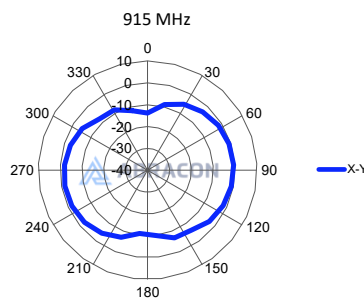
915MHz (Vertical Placement)



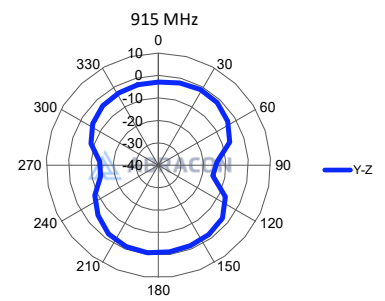
XZ plane



XY plane



YZ plane



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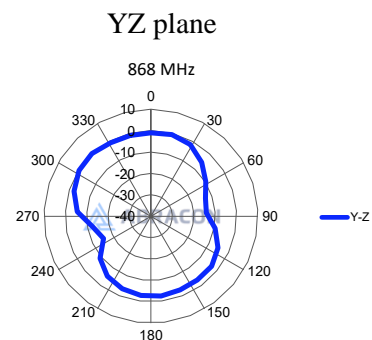
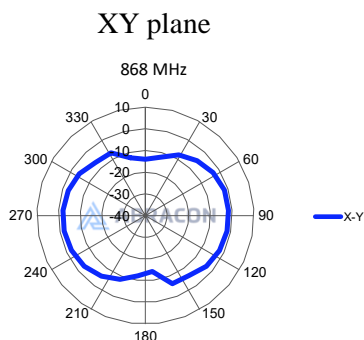
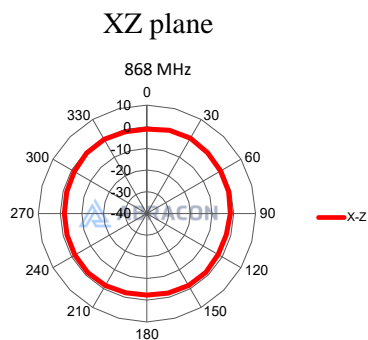
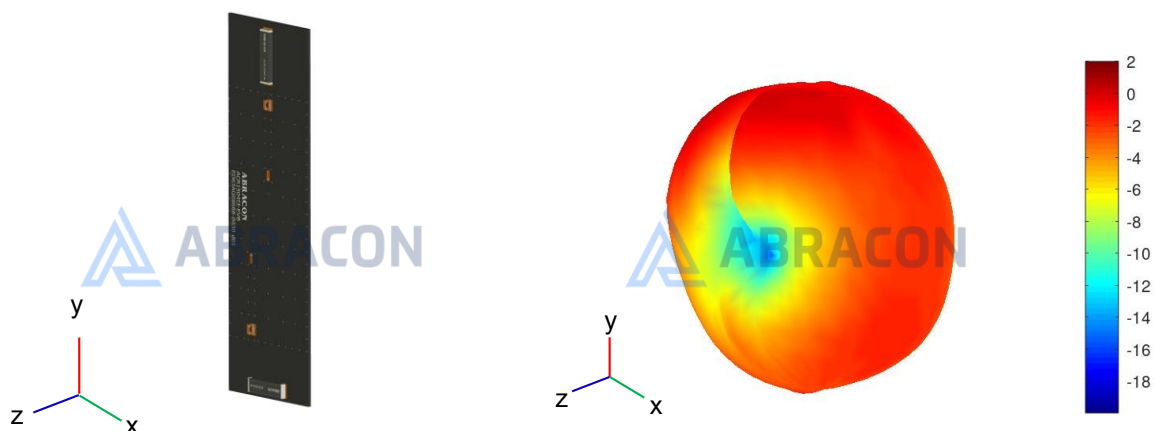


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868MHz (Horizontal Placement)



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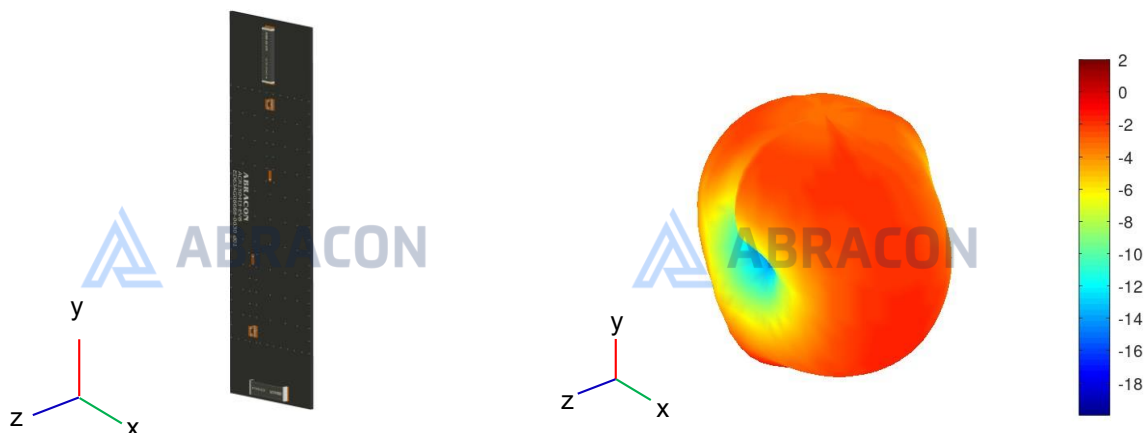


15 x 4 x 1.2 mm

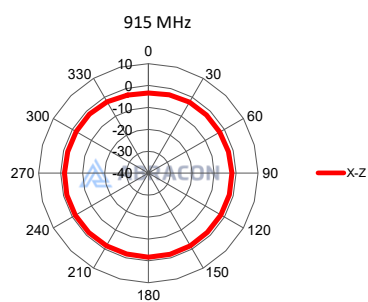
RoHS/RoHS II Compliant

MSL Level = N/A

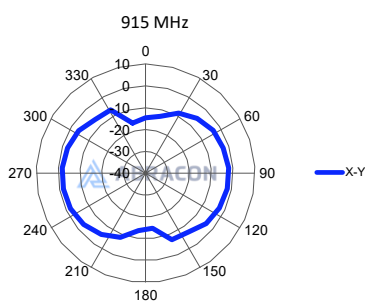
915MHz (Horizontal Placement)



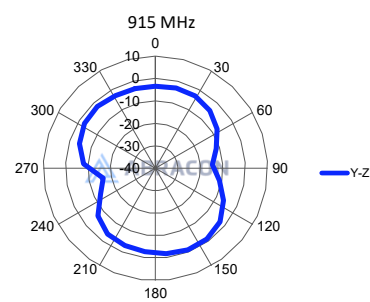
XZ plane



XY plane



YZ plane



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Reflow Profile [JEDEC J-STD-020]

96.5Sn/3Ag/0.5Cu

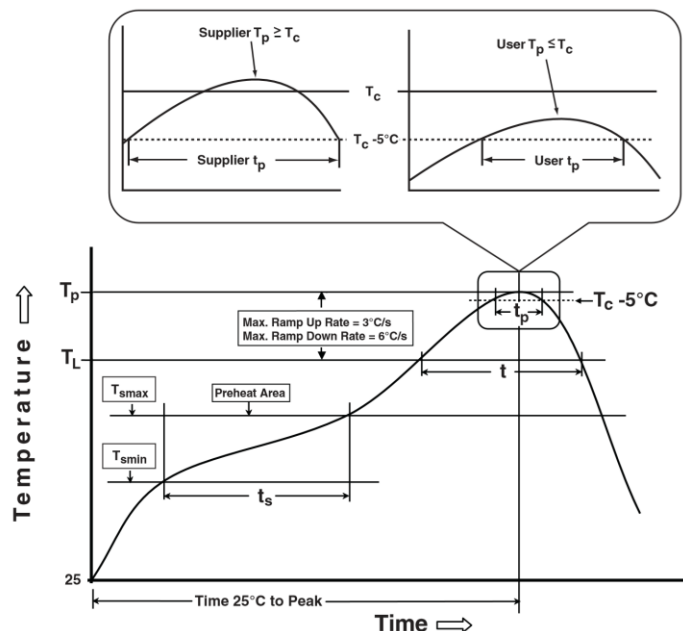


Table 1

SnPb Eutectic Process

Classification Temperatures (T_c)

Package Thickness	Volume mm ³ <350	Volume mm ³ ≥ 350
<2.5mm	235°C	220°C
≥ 2.5mm	220°C	220°C

Table 2

Pb-Free Process

Classification Temperatures (T_c)

Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >2000
<1.6mm	260°C	260°C	260°C
1.6mm - 2.5mm	260°C	250°C	245°C
>2.5mm	250°C	245°C	245°C

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat / soak		
Temperature minimum (T_{smin})	100°C	150°C
Temperature maximum (T_{smax})	150°C	200°C
Time (T_{smin} to T_{smax}) (t_s)	60 – 120 sec.	60 – 180 sec.
Average ramp-up rate (T_{smax} to T_p)	3°C/sec. max	3°C/sec. max
Liquidous temperature (T_L)	183°C	217°C
Time at Liquidous (T_L)	60 – 150 sec.	60 – 150 sec.
Peak package body temperature (T_p)*	See Table 1	See Table 2
Time (T_p)** within 5°C of the specified classification temperature (T_c)	20 sec.	30 sec.
Ramp-down rate (T_p to T_{smax})	6°C/sec. max	6°C/sec. max
Time 25°C to peak temperature	6 min. max	8 min. max
Reflow cycles	2 max	2 max

*Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and a user maximum.

**Tolerance for time at peak profile temperature (t_p) is defined as a supplier minimum and a user maximum.



5101 Hidden Creek Ln Spicewood TX 78669
Phone: 512-371-6159 | Fax: 512-351-8858
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915/868 MHZ: LPWA/ISM MULTIBAND CHIP ANTENNA



ACR1504I3

Request Samples



Check Inventory



15 x 4 x 1.2 mm

RoHS/RoHS II Compliant

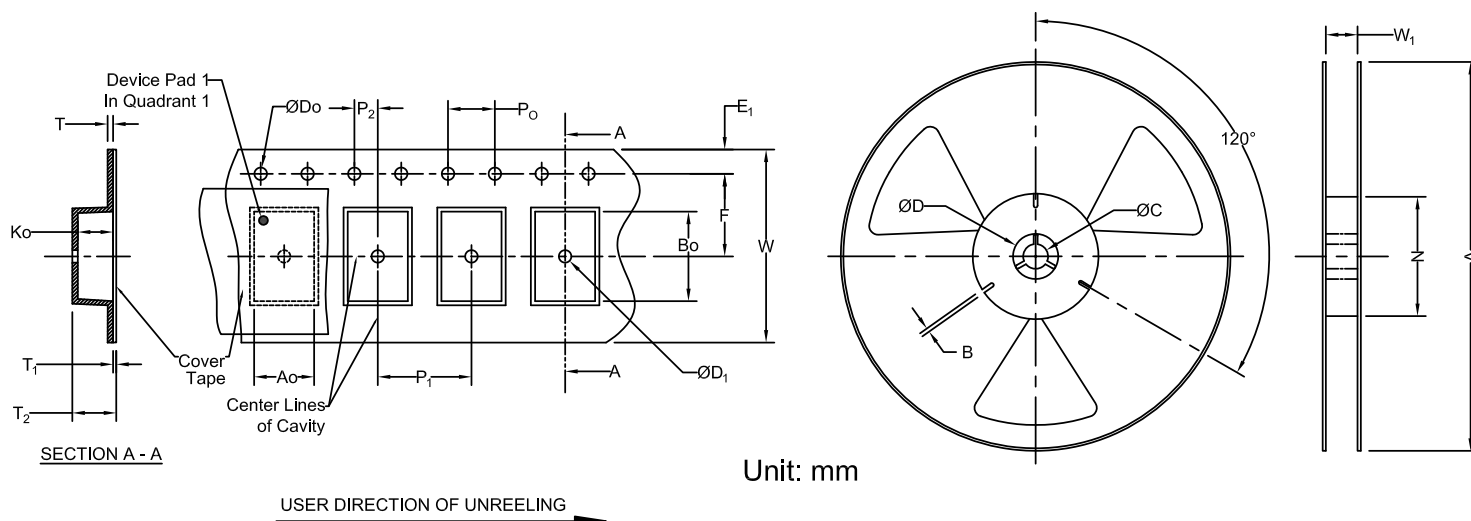
MSL Level = N/A

Packaging

Blister tape to IEC 286-3, Polymer

Number of pieces in a Tape/Reel: 3000

Tape & Reel Dimension



Unit: mm

Carrier Tape Specifications (mm)

D0	D1	E1	P0	P2	T	F	P1	W	A0	B0	K0	Reel Qty
1.50 ± 0.1	1.50 ± 0.1	1.75 ± 0.1	4.0 ± 0.1	2.0 ± 0.10	0.35 ± 0.05	11.5 ± 0.10	8.0 ± 0.1	24.0 ± 0.3	4.4 ± 0.10	15.4 ± 0.10	1.6 ± 0.10	3,000

Reel Specifications (mm)

A	W1	N	C
330 ± 1.0	24.5 ± 1.0	100	13 + 1.0 / -0.0

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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