Mutica Dual-band Wi-Fi Antenna

Part No. SR42W001 lamiiANT® Product Specification

1. Features

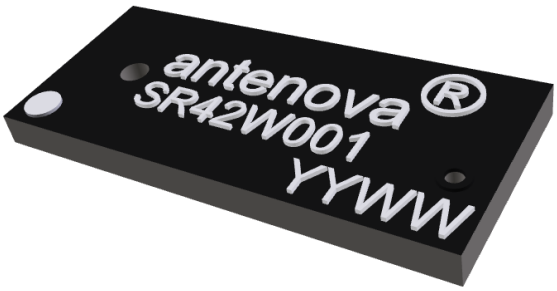
- Antenna for 2.4 – 2.5 GHz and 4.9 – 5.9 GHz applications: Wi-Fi® 802.11a/b/g/j/n/ac
- Maintains high performance on device: DFI (Designed For Integration)
- Ultra compact
- SMD mounting
- Supplied on Tape and Reel

2. Description

Mutica is intended for use with all dual-band Wi-Fi applications. Only requires a small ground plane and integrates into the corner with minimal PCB clearance area. Design centred on being part of the device and not designing the device around the antenna (DFI - Designed for Integration). Ideal for single and MIMO antenna systems.

3. Applications

- Access Points
- Portable Devices
- Headsets
- PC-cards
- Game Consoles
- Set-Top-Box
- Network Devices
- Wearable devices
- MIMO Systems



Antennas for Wireless M2M Applications

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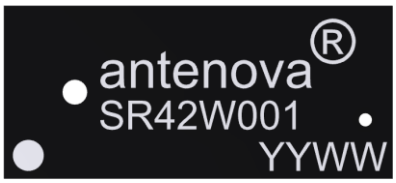
4. Part Number

Mutica: SR42W001



5. General Data

Product name	Mutica dual band Wi-Fi antenna
Part Number	SR42W001
Frequency	2.4-2.5GHz;4.9-6.0GHz
Polarization	Linear
Operating temperature	-40°C to140°C
Environmental condition test	ISO16750-4 5.1.1.1/5.1.2.1/5.3.2
Impedance with matching	50 Ω
Weight	< 0.5 g
Antenna type	SMD
Dimensions	11.3 x 5.0 x 0.8 (mm)

6. RF Characteristics

	Typical performance	Conditions
Peak gain	2.0dBi	**2.4 – 2.5 GHz frequency range** All data measured on Antenova's evaluation PCB Part No. SR42W001-U1
Average gain	-0.5dBi	
Average efficiency	>75%	
Maximum return loss	-12dB	
Maximum VSWR	1.5:1	

	Typical performance	Conditions
Peak gain	3.0dBi	**4.9 – 5.9 GHz frequency range** All data measured on Antenova's evaluation PCB Part No. SR42W001-U1
Average gain	-2.5dBi	
Average efficiency	>65%	
Maximum return loss	-6.0dB	
Maximum VSWR	2.70:1	

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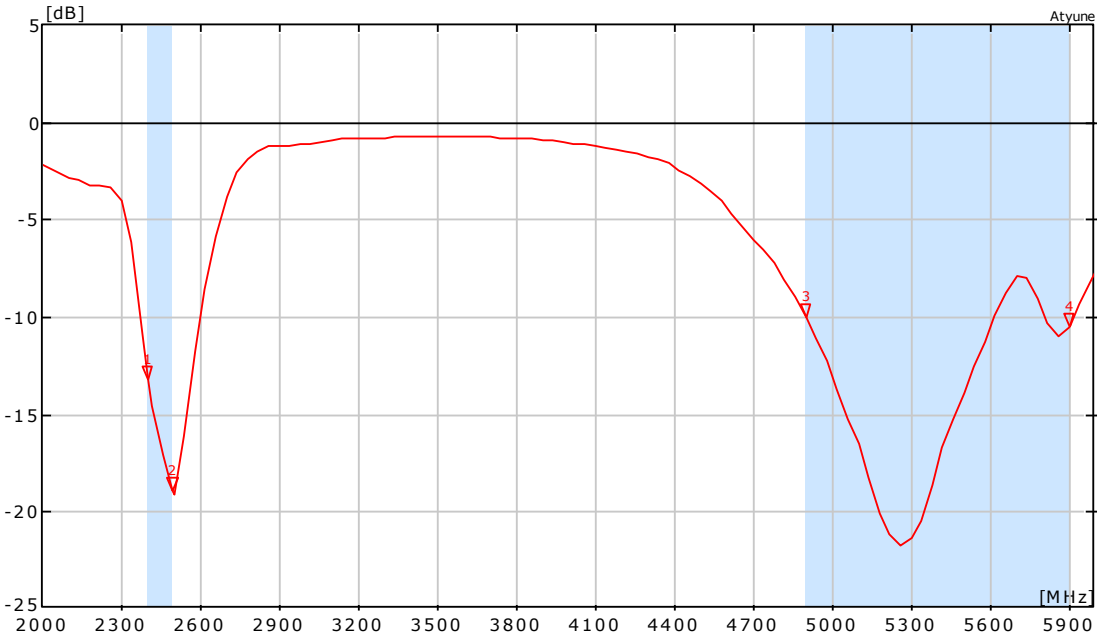
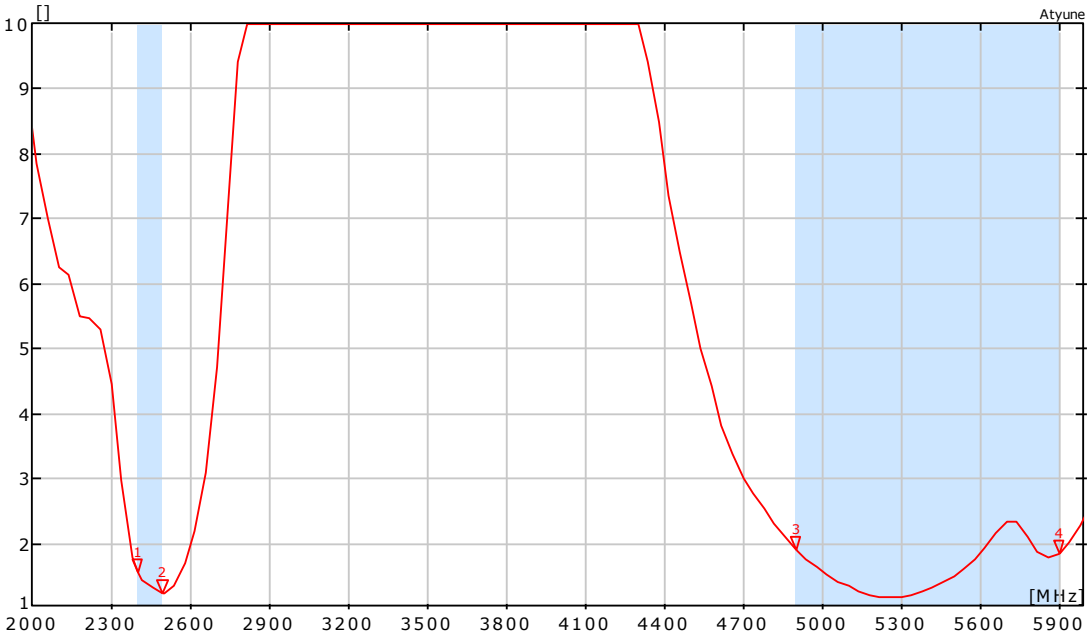
7. RF Performance

7.1 Return Loss



7.2 VSWR



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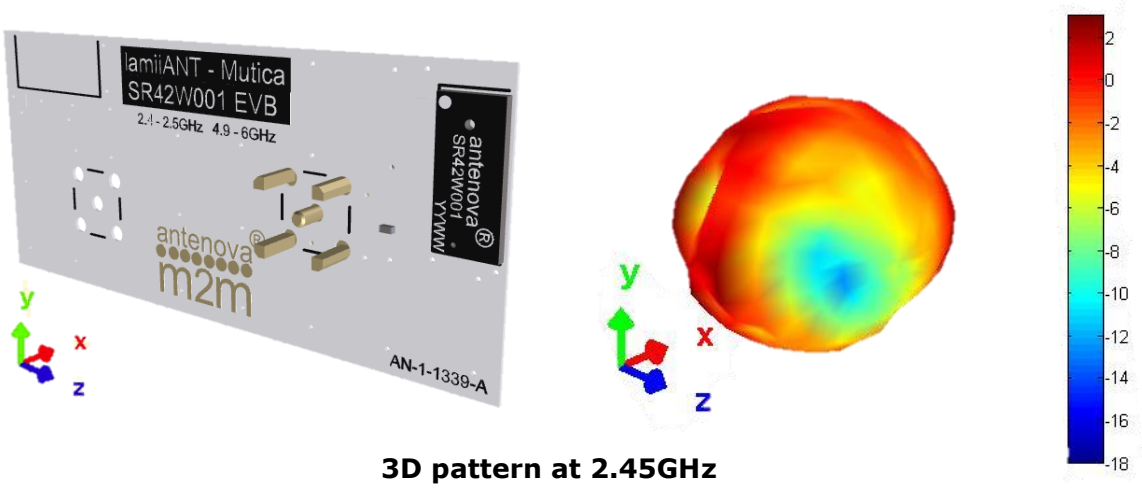
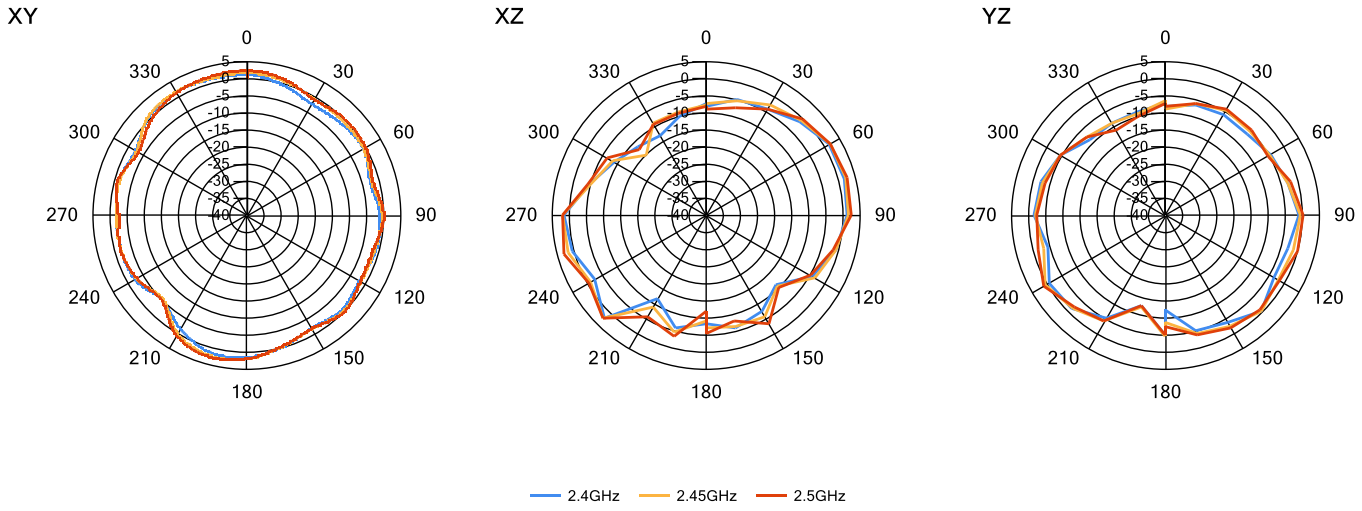
7.3 Antenna patterns

7.3.1 2400 MHz – 2500 MHz



3D pattern at 2.45GHz
Drag to rotate pattern and PCB by using Adobe Reader
(Click to Activate)



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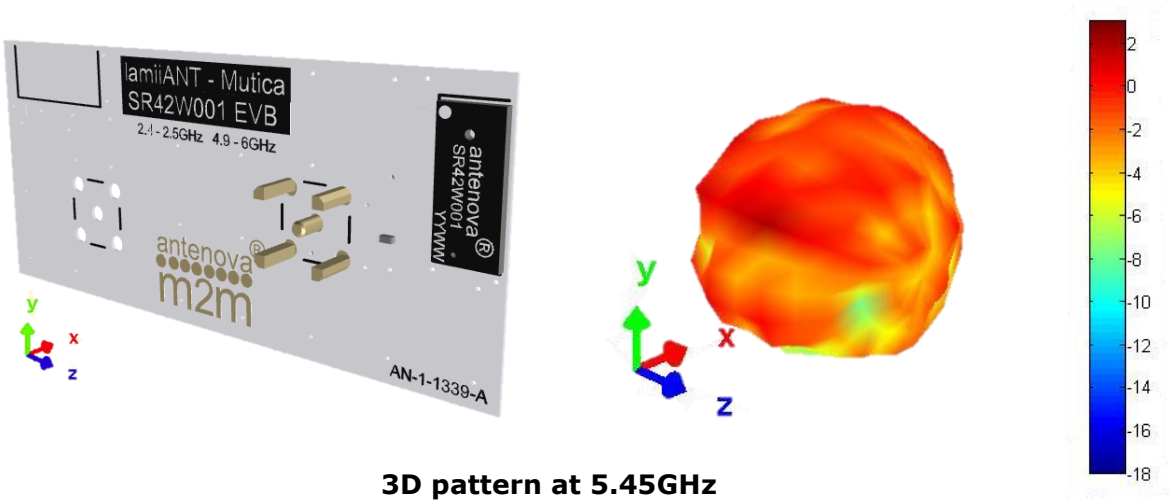
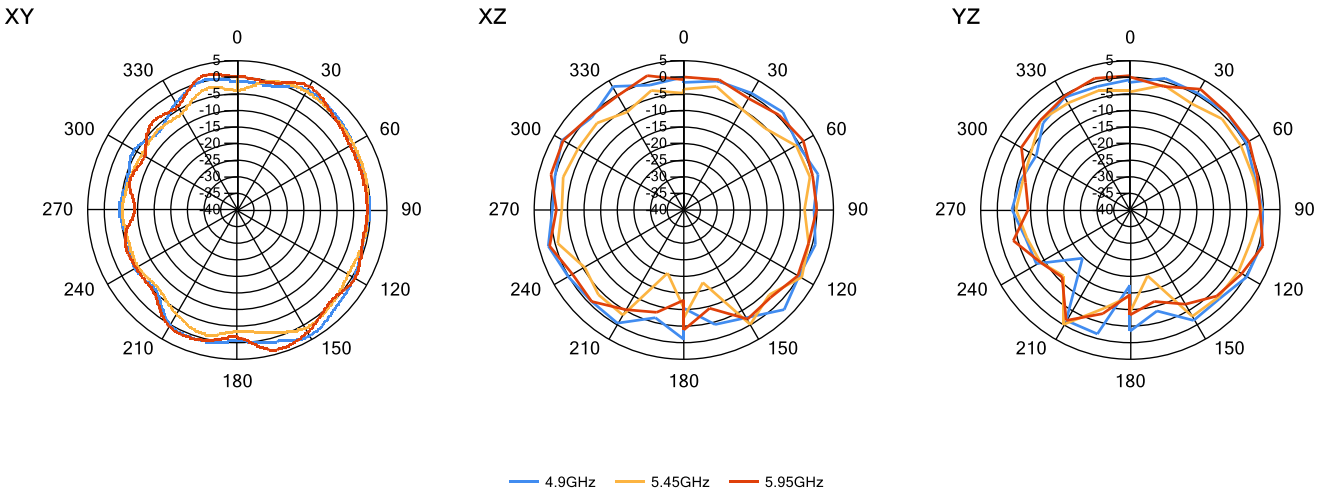
7.3.2 4900 MHz – 5900 MHz



3D pattern at 5.45GHz
Drag to rotate pattern and PCB by using Adobe Reader
(Click to Activate)



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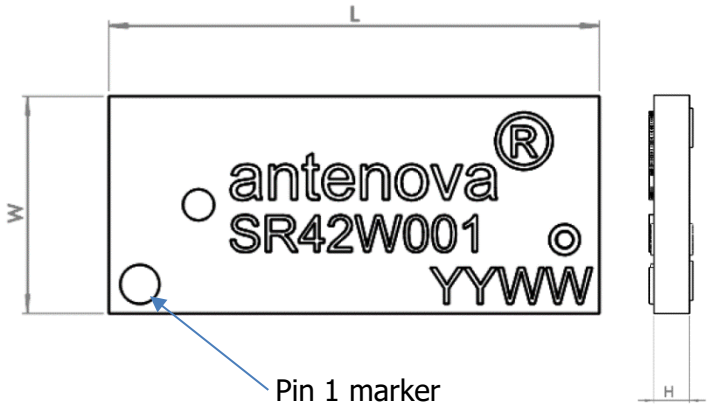
8. Antenna Dimensions

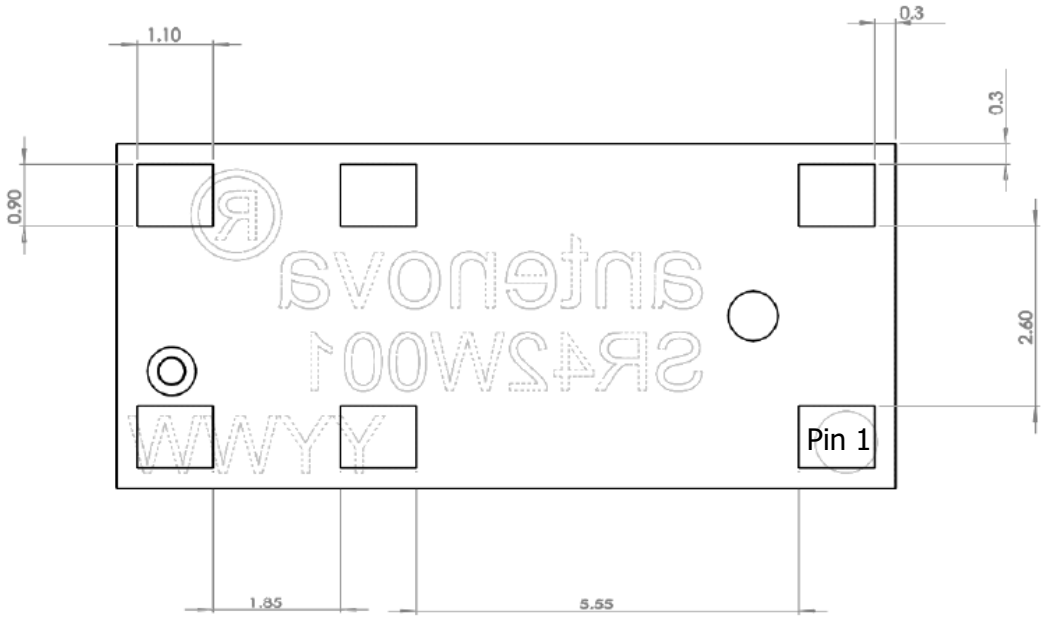


L	W	H
Length	**Width**	**Height**
11.3	5.0	0.9

All dimensions in mm

Bottom side dimensions

6 solder pads (1.1 x 0.9 mm)



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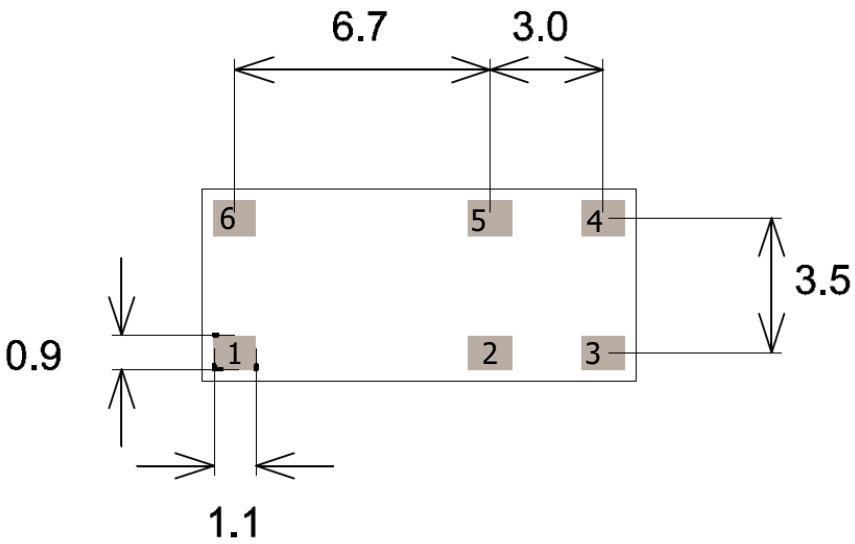
9.0 Antenna footprint

The recommended host PCB footprint is below.

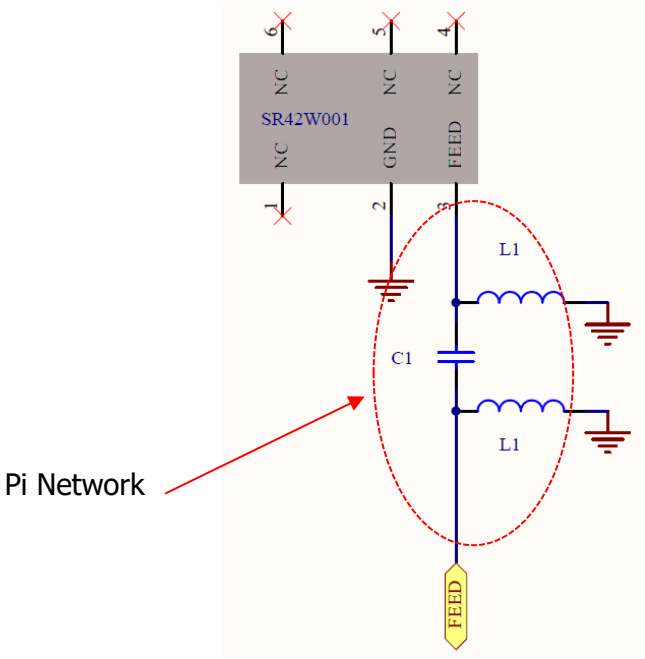


6 copper pads all 1.1 x 0.9 (mm)

*CAD files of the antenna footprint are available at www.antenova-m2m.com.

10.0 Schematic

The circuit for the antenna and the matching components is below. The RF feed connection and GND connections are critical to the function of the antenna, and must be followed as shown. This circuit can be used for the circuit capture of the host PCB.



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11. Electrical Interface

11.1 Transmission Line

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

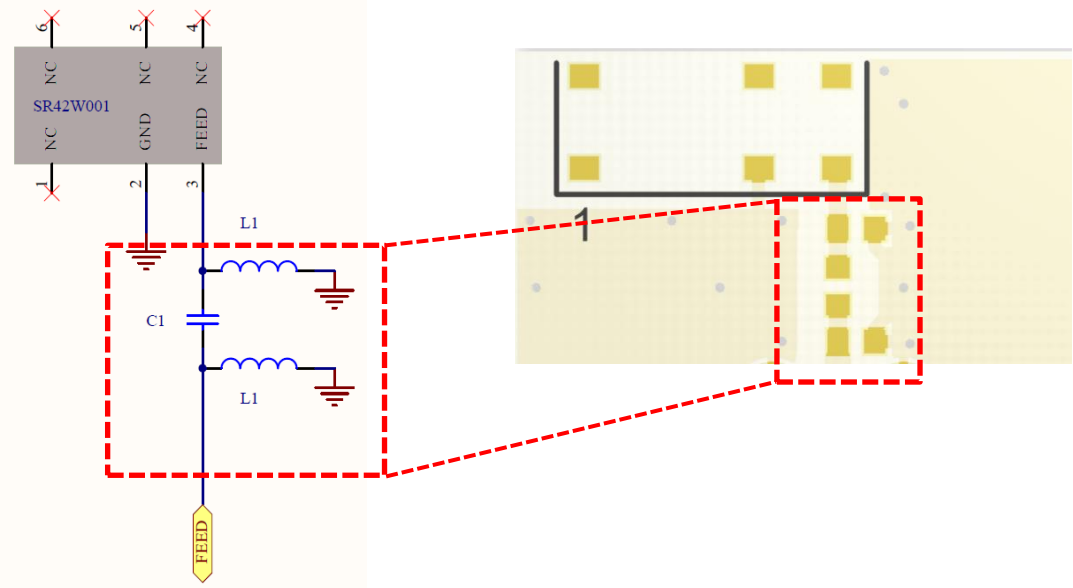
• The length of the transmission lines should be kept to a minimum
• Any other parts of the RF system like transceivers, power amplifiers, etc, should also be designed to have an impedance of 50 Ω

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 line is 50 Ω.

11.2 Matching Circuit

The antenna requires a matching circuit that must be optimized for each product. The matching circuit will require up to three components and the following pad layout should be designed into the device so the correct circuit can be installed.

The Pi matching network must be placed close to the antenna feed to ensure it is more effective in tuning the antenna.



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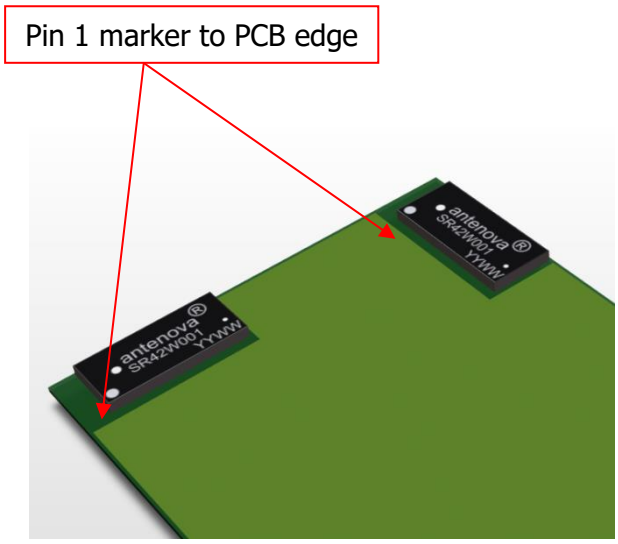
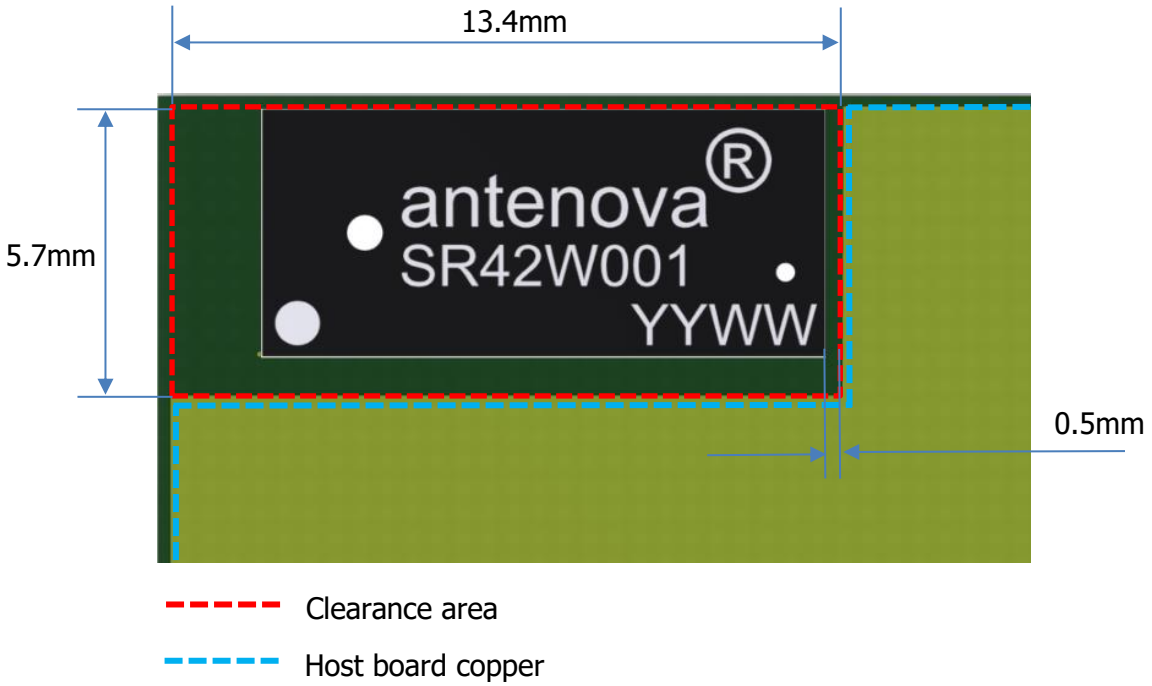
12.0 Antenna Integration Guide

12.1 Antenna Placement

Whichever the host PCB size used, the antenna should be placed into the PCB corner. Ideally Pin 1 should be closest to the PCB edge.



The antenna requires a copper clearance on all PCB layers under the antenna section. The clear-out area is defined below. The clearance is minimal but must be followed for the antenna to function correctly.



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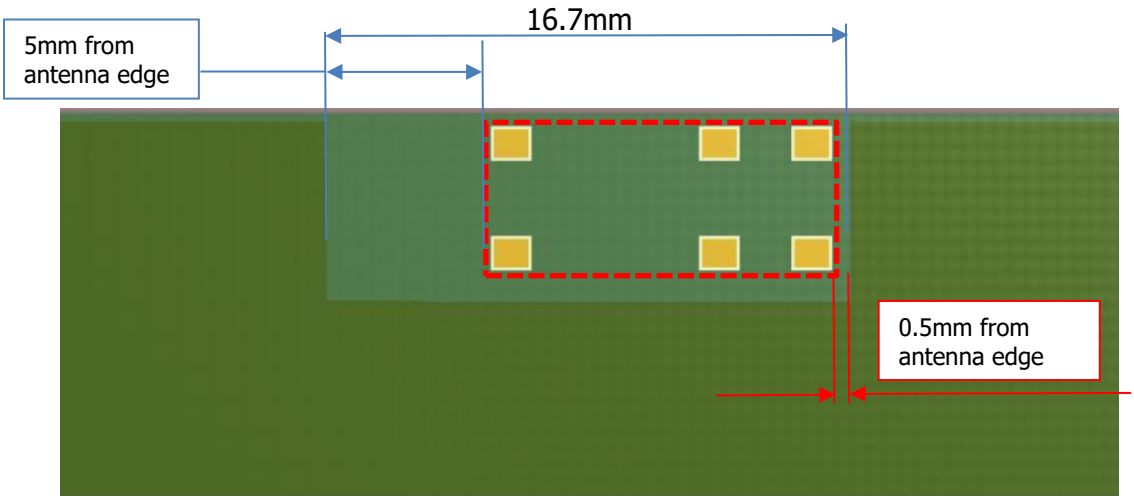
For locations that are not on the corner the following clearances are required from each side of the antenna to GND.



Centre PCB placement example

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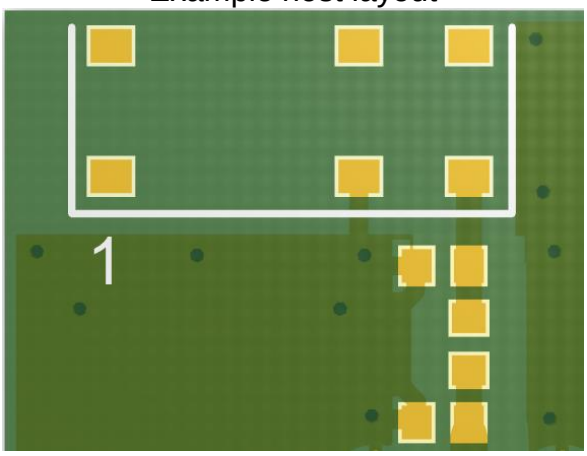
12.2 Host PCB Layout

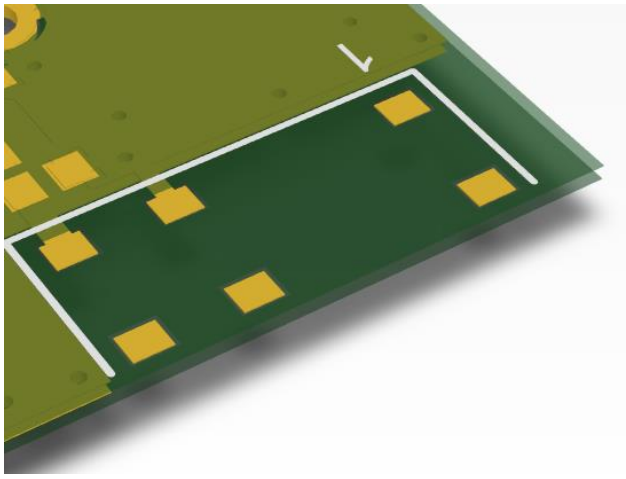
The host PCB must ensure the footprint and clearance meets the antenna specification. An example of the PCB layout shows the antenna footprint with clearance. The antenna uses solder mask defined pads. Pin 2(GND) is shown directly connecting to the GND in the shortest route. The feed connects to the matching circuit close to the antenna.

Example host layout



Below shows the antenna footprint and clearance through all layers on the PCB. Only the antenna pads and connections to feed and GND are present within the antenna area

Example host layout



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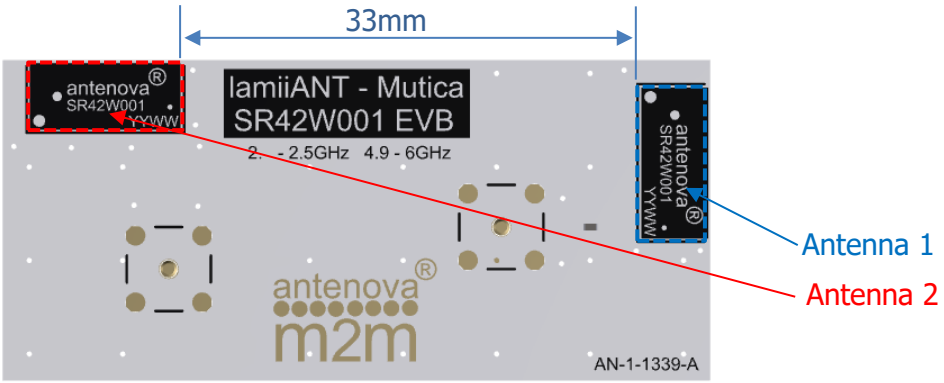
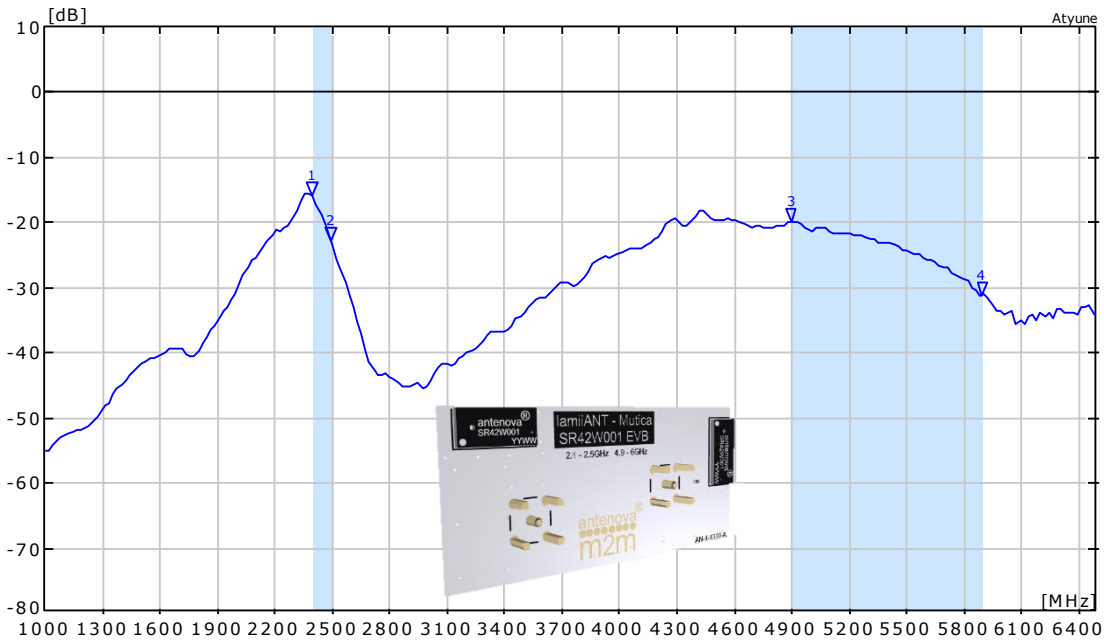
13.0 MIMO Application example.

Mutica works well in multiple antenna systems with simple integration to ensure good isolation between antennas. Below is an example of a 2 X MIMO system.



Two antennas placed perpendicular to each other. Both antennas were optimised and matched for the same bands using the Antenova evaluation PCB. An S21 measurement between these antennas shows good isolation of <15dB minimum.



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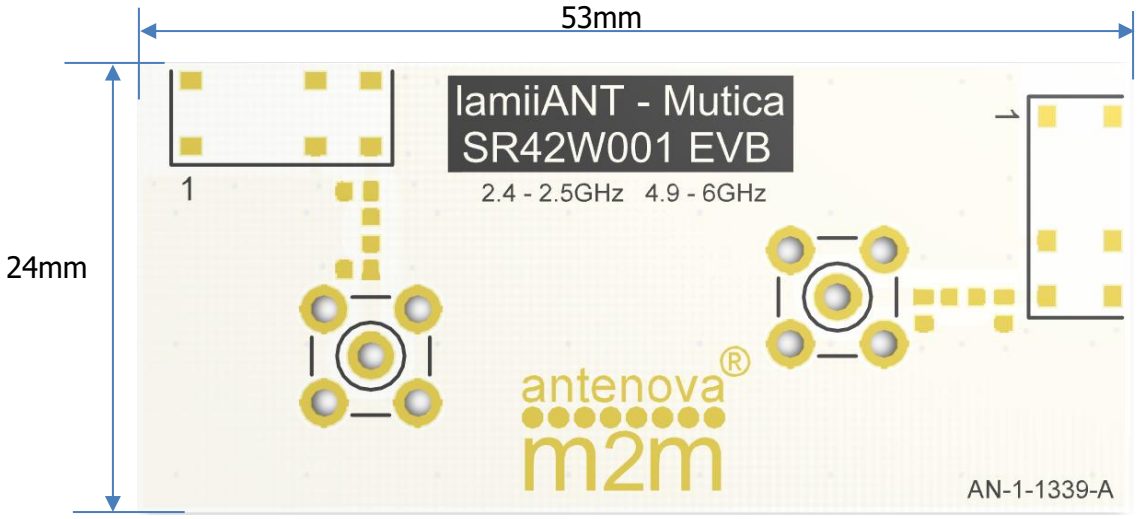
14.0 Reference Board

The reference board has been designed for evaluation purposes of SR42W001 includes a SMA female connector.

SRCW004 Evaluation Board



To order a reference board contact sales@antenova-m2m.com
Please state if single or two antenna EVB is required.

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15. Soldering

This antenna is suitable for lead free soldering.
The reflow profile should be adjusted to suit the device, oven and solder paste, while observing the following conditions:

- The maximum temperature should not exceed 240 ºC
- However for lead free soldering, a maximum temperature of 255 ºC for no more than 20 seconds is permitted.
- The antenna should not be exposed to temperatures exceeding 120 ºC more than 3 times during the soldering process.

16. Hazardous Material Regulation Conformance

The antenna has been tested to conform to RoHS requirements. A certificate of conformance is available from Antenova M2M's website.

17. Packaging

17.1 Optimal Storage Conditions

Temperature	-10ºC to 40ºC
Humidity	Less than 75% RH
Shelf life	24 Months
Storage place	Away from corrosive gas and direct sunlight
Packaging	Reels should be stored in unopened sealed manufacturer's plastic packaging.

Note: Storage of open reels of antennas is not recommended due to possible oxidization of pads on antennas. If short term storage is necessary, then it is highly recommended that the bag containing the antenna reel is re-sealed and stored in like storage conditions as in above table.

The shelf life of the antenna is 2 years provided the factory seal on the package has not been broken.

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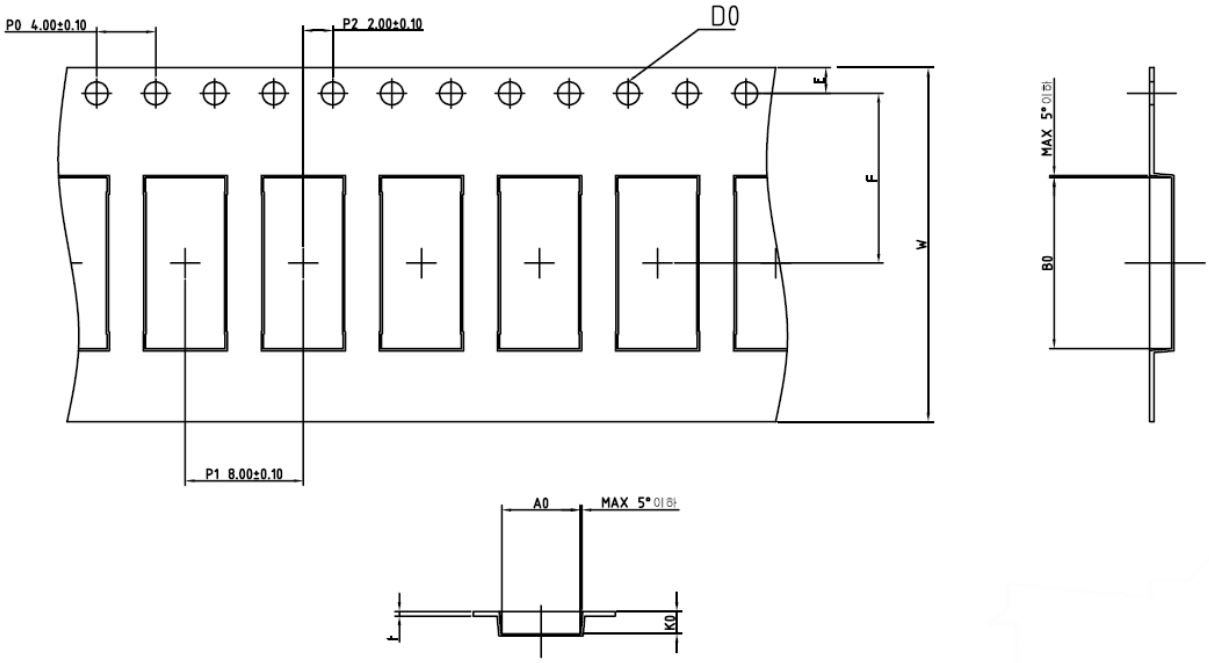
17.2 Tape Characteristics



Do	Ao	Bo	P0	P1	P2
1.55 +0.1	5.30 ± 0.1	11.605 ± 0.1	4.00 ± 0.1	8.00 ± 0.1	2.00 ± 0.1

E	F	W	K0
1.75 ± 0.1	11.50 ± 0.1	24.00 ± 0.3	1.40 ± 0.1

Dimensions in mm

Notes:
a) Sprocket hole pitch cumulative tolerance = ±0.2 per 10
b) Chamber not to exceed 1mm in 100mm
c) Ao and Bo measured on a plane 0.1mm above the bottom of the pocket.
d) K0 measured from a plane on the inside bottom of the pocket to the top surface of the carrier.

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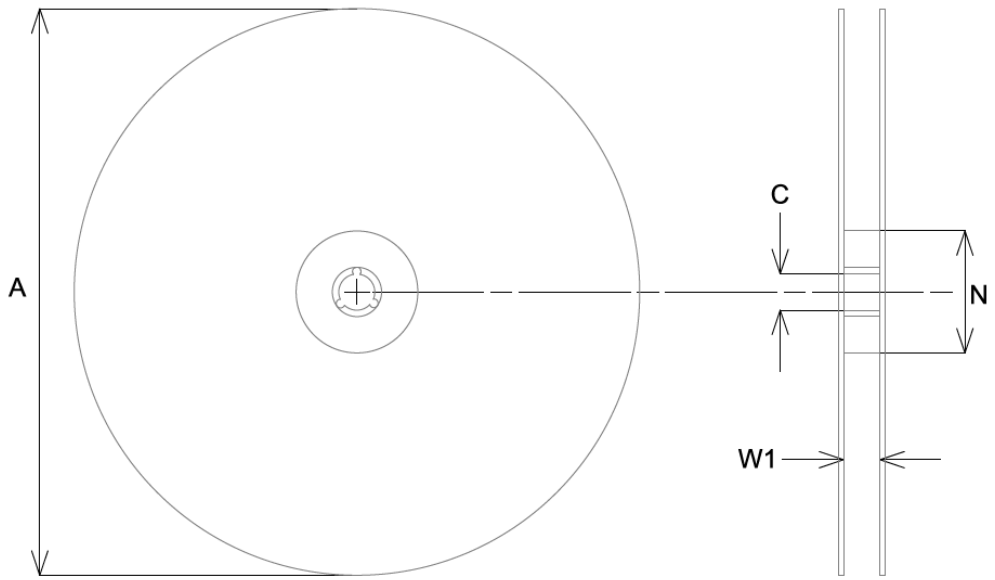
17.3 Reel Dimensions



A	C	N	W1
178.0 ± 2.0	13.2 ± 0.5	60.0	14.0

All dimensions in mm

Quantity	Leading Space	Trailing Space
1000 pcs / reel	16 blank holders	24 blank holders

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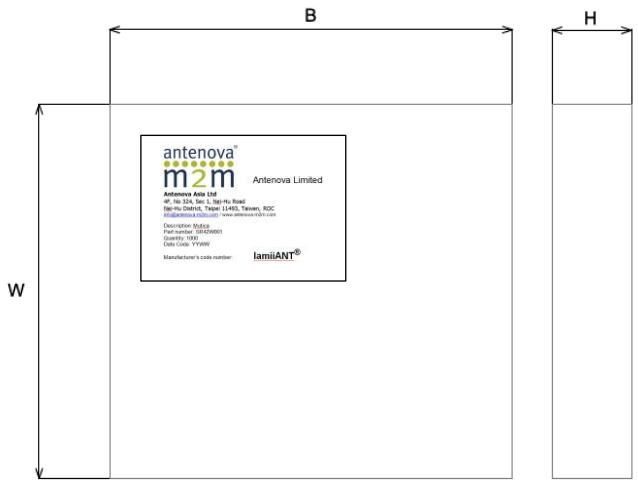
17.4 Box Dimensions

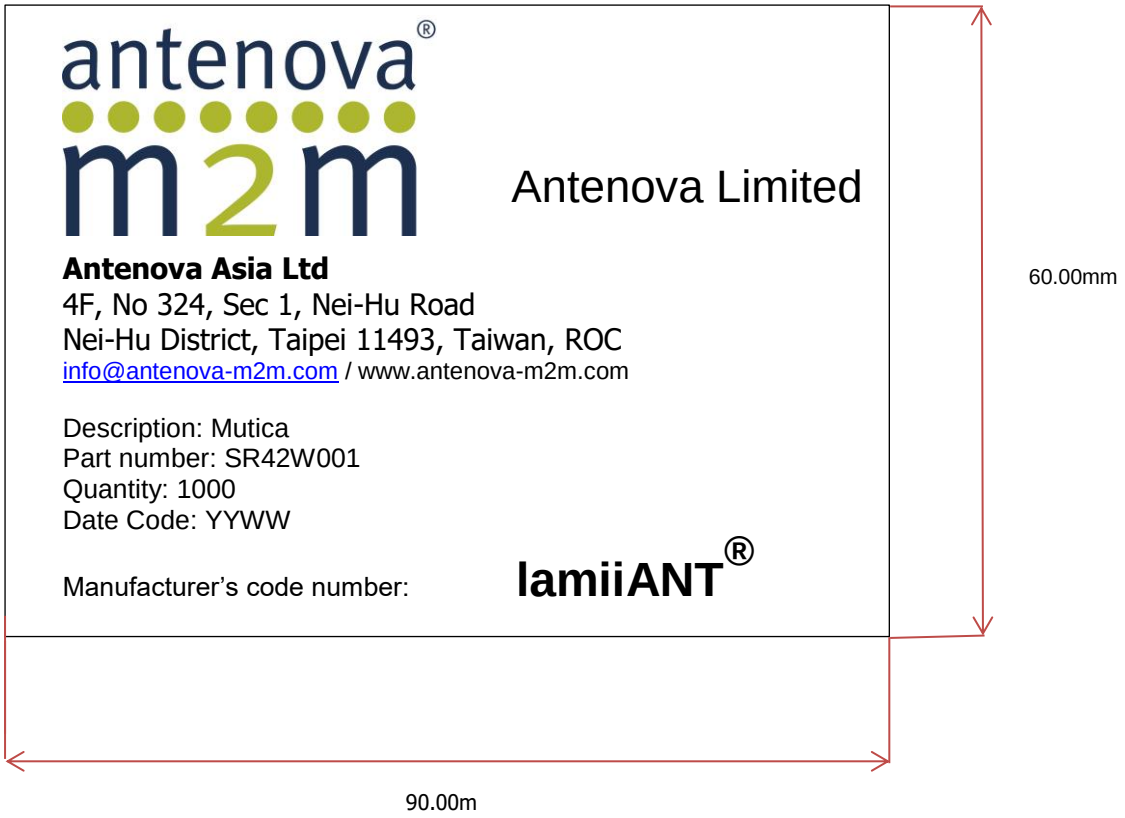


Width (W)	Breadth (B)	Thickness (H)
203mm	188mm	40mm

17.5 Bag Properties

Reels are supplied in protective plastic packaging.

17.6 Reel Label Information



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