

## 1 Features

- Multi GNSS solution for embedded applications
- High Efficiency to size ratio
- Design for use with no ground beneath the antenna
- Near omni-directional characteristics enable good performance for any device
- Designed for SMD mounting
- Low profile, small footprint, light weight
- Supplied in tape on reel

## 2 Description

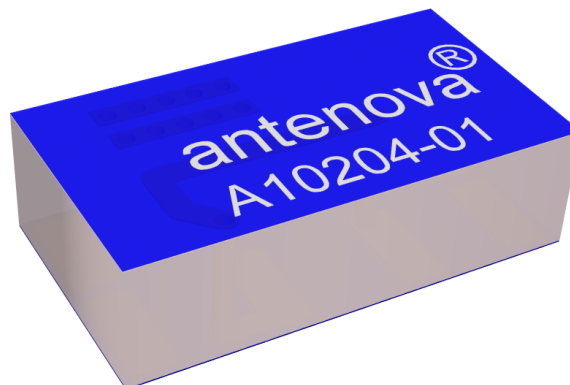
Brevis-GNSS is intended for use with multi GNSS bands. These include GPS, GLONASS, GALILEO and Beidou.

The antenna uses a ground plane in order to radiate efficiently, but this ground plane must not extend underneath the antenna itself.

The antenna has RHCP characteristics suitable for GNSS signals.

## 3 Applications

- Small mobile handheld devices with any GNSS receivers.
- Application specific tracking devices.
- Location accessories: SDIO cards, PCMCIA cards.



## 4 Part number

**Brevis-GNSS: A10204-01**



## 5 General data

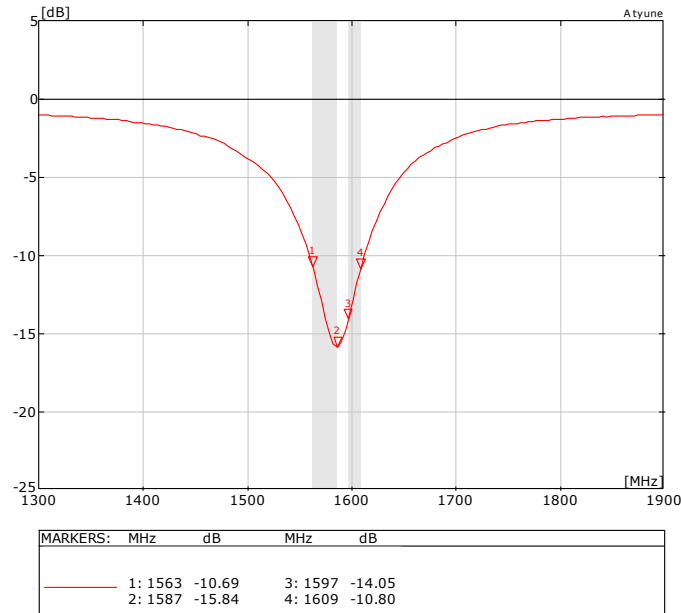
Product name	Brevis-GNSS
Part Number	A10204-01
Frequency	1559-1609MHz
Polarization	Linear
Operating temperature	-40 °C to +140 °C
Environmental condition test	ISO16750-4 5.1.1.1/5.1.2.1/5.3.2
Impedance with matching	50 Ω
Weight	<0.2g
Antenna type	SMD
Dimensions	11.0 x 6.0 x 3.2 [mm]
Footprint Size	11.0 x 6.0 [mm]

## 6 Electrical characteristics

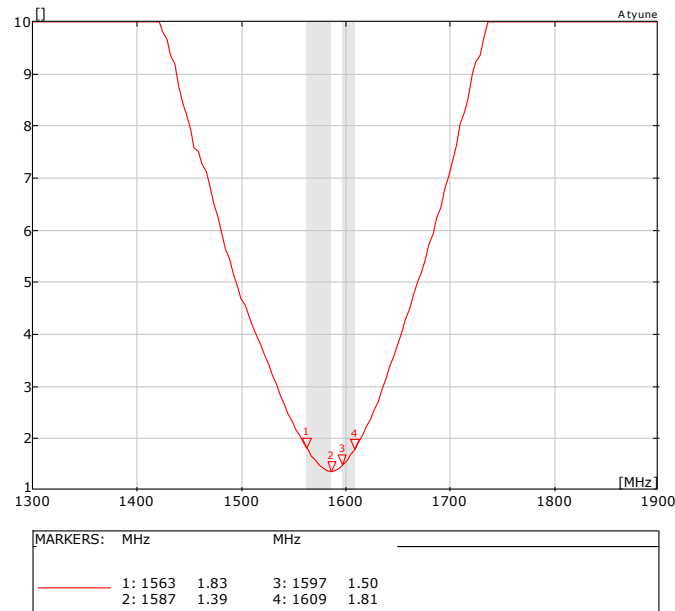
	Typical performance	Conditions
Peak gain	0.5 dBi	All data measured on Antenna's reference board, part number A10204-U2
Average gain	0.25 dBi	
Average efficiency	50%	
Maximum Return Loss	-10 dB	
Maximum VSWR	1.9:1	

## 7 Electrical performance

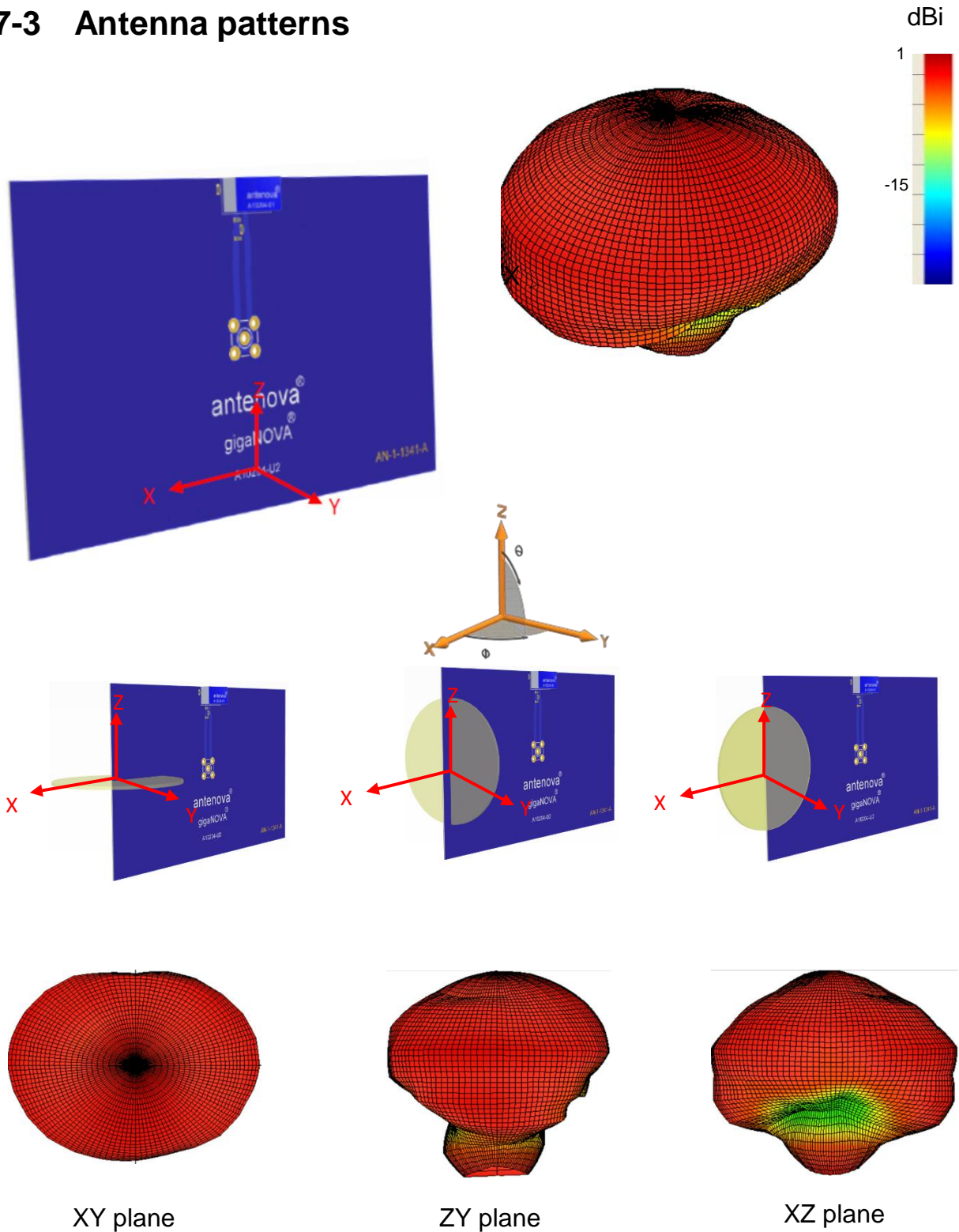
### 7-1 Return Loss



### 7-2 VSWR



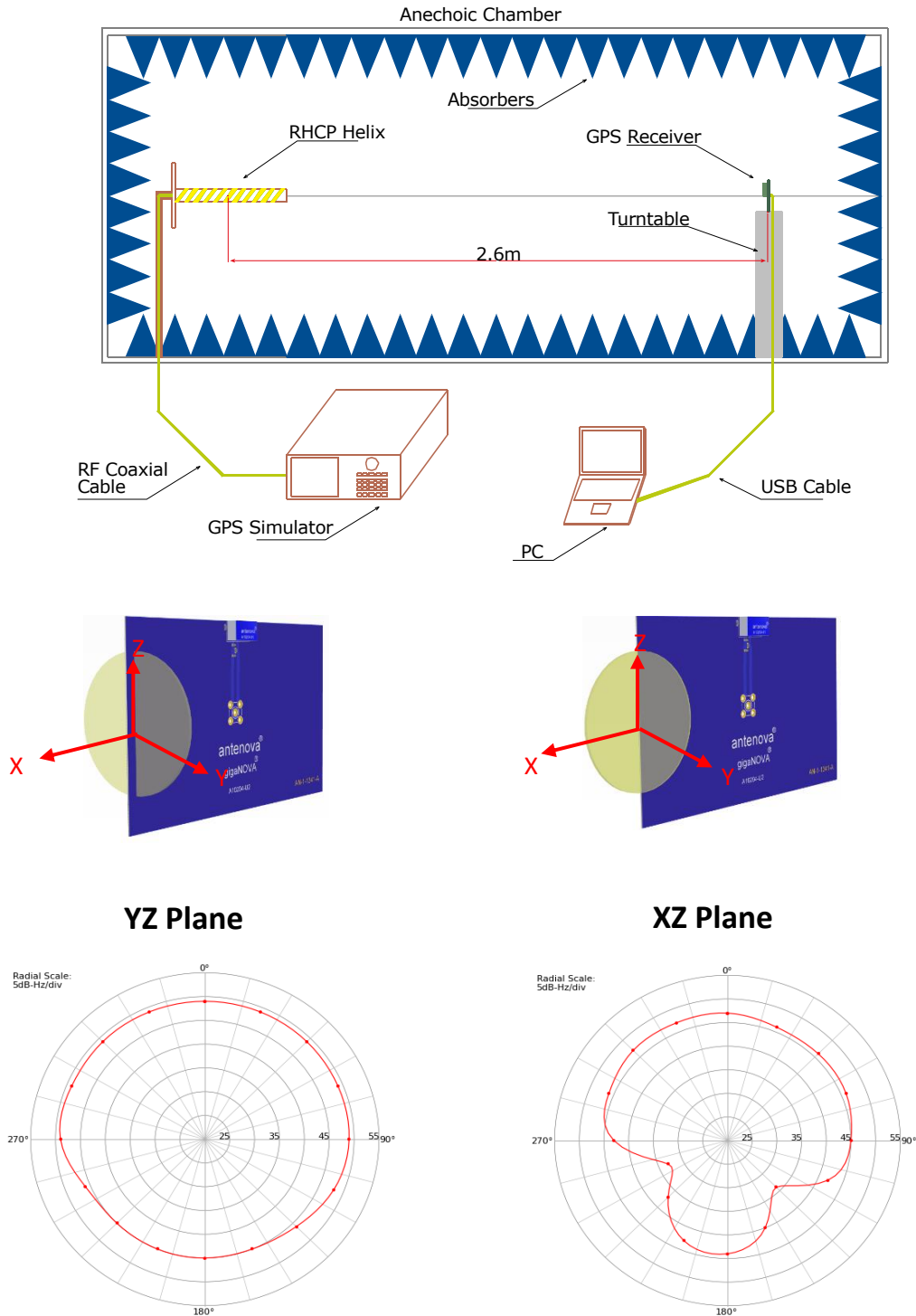
### 7-3 Antenna patterns



Patterns show combined polarisations  
measured on reference board A10381-U2

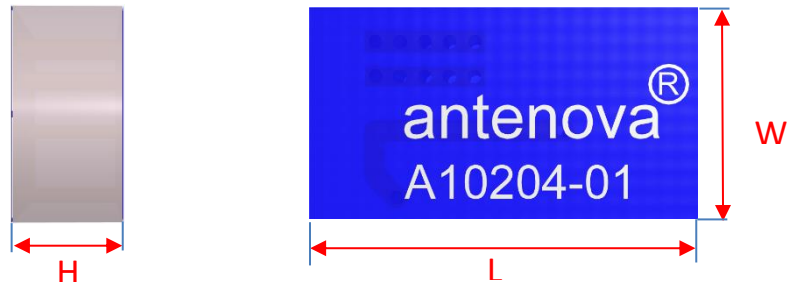
### 7-3 Antenna patterns

The typical radiation pattern of the Brevis-GNSS A10204-01 GPS antenna has been measured in Antenova's "Active GPS" chamber, using Antenova's standard RF module based on MTK3337 IC combined with two stages of Saw Filters.



## 8 Antenna dimensions

### Brevis-GNSS

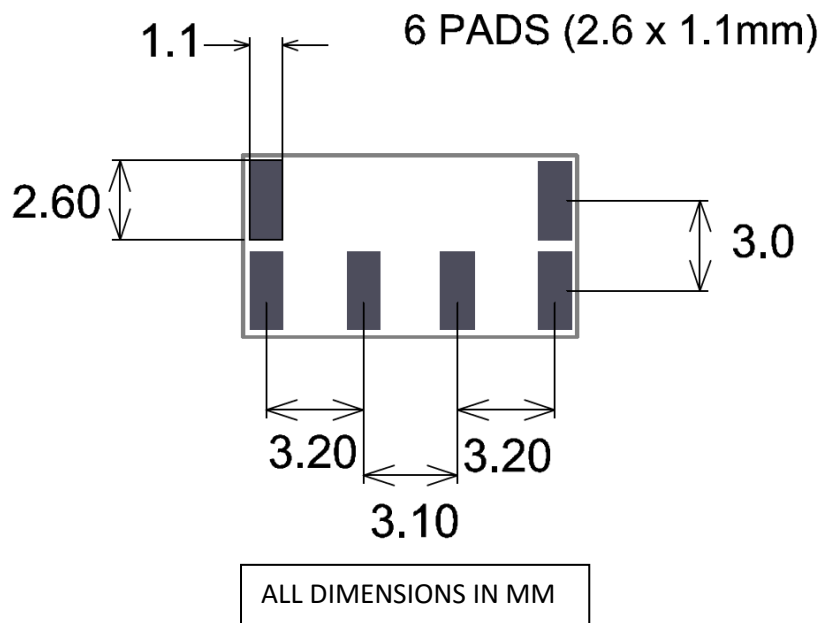


L	W	H
Length	Width	Height
11.0 ± 0.1	6.0 ± 0.1	3.2 ± 0.1

Dimensions in mm

## 9 Antenna footprint

### Brevis-GNSS (Part No: A10204-01)



\* CAD files of the antenna footprint are available to download from [www.antenna-m2m.com](http://www.antenna-m2m.com)

## 10 Electrical interface

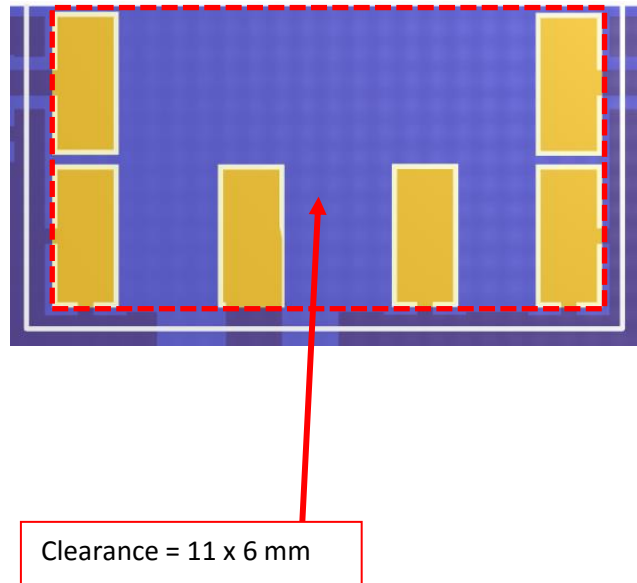
### 10-1 Transmission lines

- All transmission lines should be designed to have a characteristic impedance of  $50\Omega$
- 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  $50\Omega$

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 coplanar transmission line is  $50\Omega$ .

## 10-2 Clearance

The antenna requires a clearance on the host PCB. With exception of the footprint pads the area shown below should be kept clear from all copper. No tracks or copper planes must be placed within this area. Any deviation from the advised layout shown below will result in a loss in the antenna performance. It is best that the copper track layout is imported from CAD files which are available from Antenova M2M on request. Please contact [sales@antenova-m2m.com](mailto:sales@antenova-m2m.com) for further details.

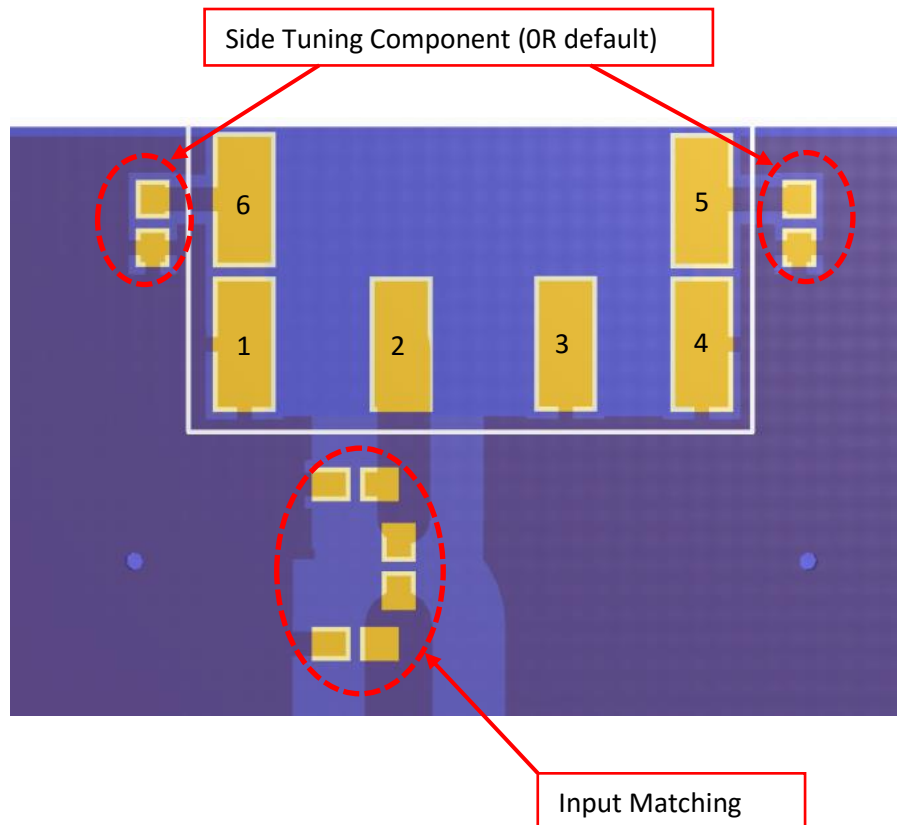




### 10-3 Matching circuit

The antenna requires a matching circuit that must be optimized for each customer's product. The matching circuit will require up to three components (0402 size), and an additional tuning element is also required (0402 size) the following pad layout should be designed into the device so the correct circuit can be installed.

Note: The tuning element by default is a 0402 zero ohm resistor

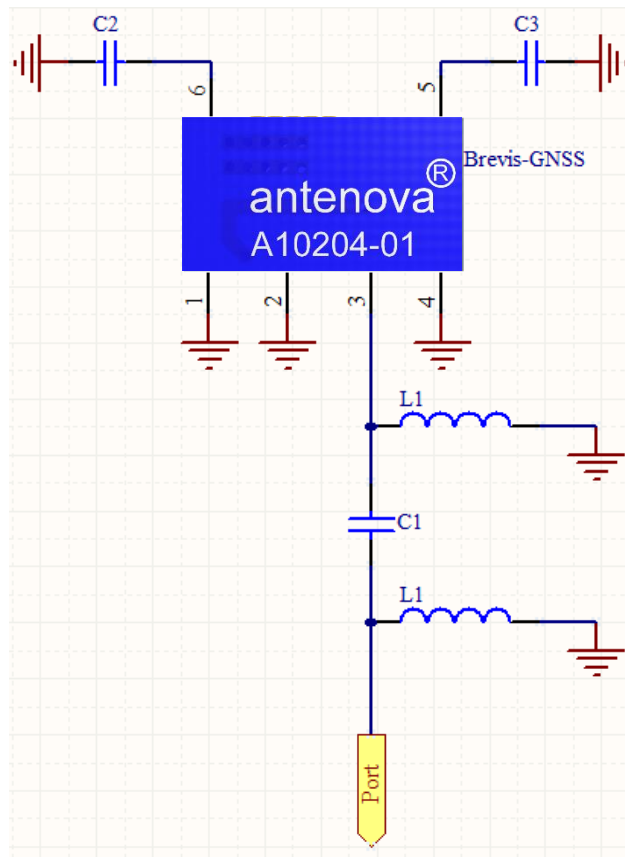


In addition to the matching circuit, a separate DC blocking capacitor will also be required between the radio and the antenna matching circuit.

**Note: The component values for the matching circuit will vary depending on the size of the PCB and surrounding components.** The impedance of the antenna should be measured before selecting suitable matching components. Antenova M2M offers this service on request.

## 10-4 Matching circuit (Schematic)

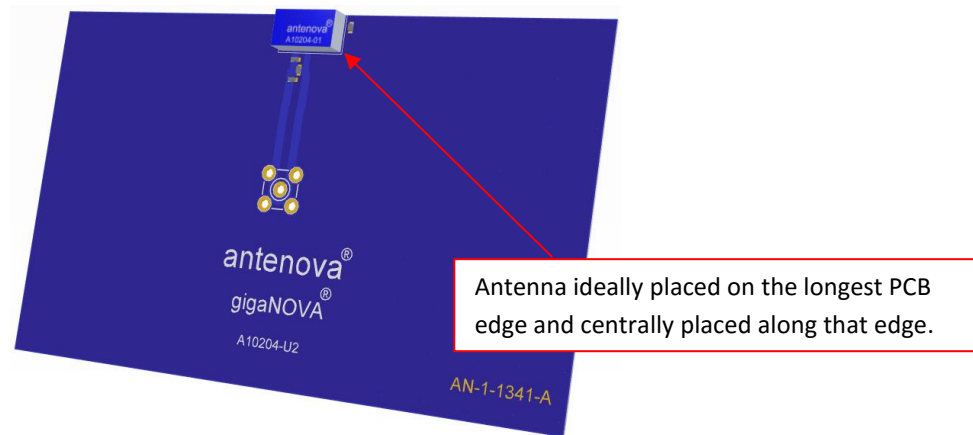
The electrical circuit for the antenna matching is shown here. The values are dependent on the device. C2 and C3 are default to 0R resistors.



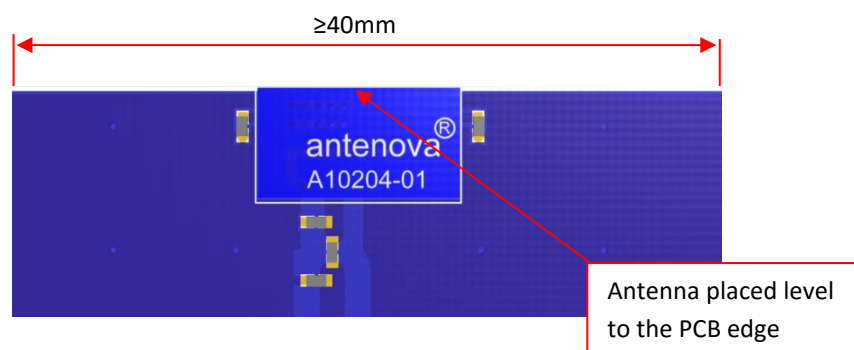
Contact [sales@antenoVA-m2m.com](mailto:sales@antenoVA-m2m.com) for further information.

## 10-5 Antenna placement

Antenova M2M strongly recommends placing the antenna near the edge of the board. Maximum antenna performance is achieved by placing the antenna towards the middle of the PCB, as shown in the diagram below. Other configurations are possible but recommend contacting Antenova for advice on any other antenna placement options.



- The antenna top edge must be placed level with the edge of the host PCB.
- The minimum length of the host PCB should be no less than 40mm.



- Central placement of the antenna is advised. However, an offset placement is also possible.
- The antenna must be placed no closer to a PCB side than 10mm.

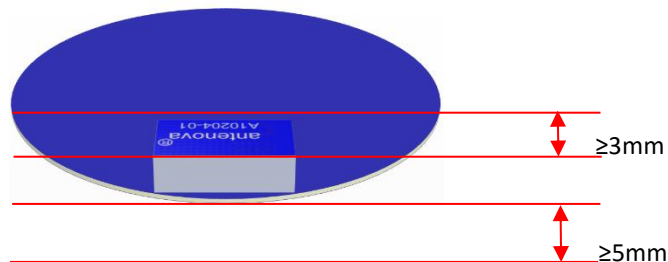


- The minimum PCB size for the antenna should be no smaller than 40mm X 30mm
- Additional electronic components near the antenna should be at a distance of at least 2 mm away from the ground plane edges. The antenna should also be clear of ground from both the top surface of the antenna and below the antenna.

## 10-6 Wearable Application Guidance

The antenna can be used for wearable applications. A minimum distance must be maintained between the antenna and the human body.

- Watch Application (PCB Radius 20mm)
- Minimum distance to human body shown below.



- The device case will act as the spacer to keep the antenna from going below the minimum distance.

**Note: The RF front end of the receiver will determine the overall performance.** To ensure optimum device performance Antenova can review the device schematic and layout for the relevant GNSS sections. Please contact Antenova M2M for more information.

## 10-7 Reference board

The reference board has been designed for evaluation purposes of Brevis-GNSS and it includes a SMA female connector

### Brevis-GNSS A10204-U2 Reference Board



Dimensions in mm

To order a reference board contact [sales@antenna-m2m.com](mailto:sales@antenna-m2m.com)

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

## 12 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.

## 13 Packaging

### 13-1 Optimal storage conditions for packaged reels

<b>Temperature</b>	-10°C to 40°C
<b>Humidity</b>	Less than 75% RH
<b>Shelf Life</b>	18 Months
<b>Storage place</b>	Away from corrosive gas and direct sunlight
<b>Packaging</b>	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.

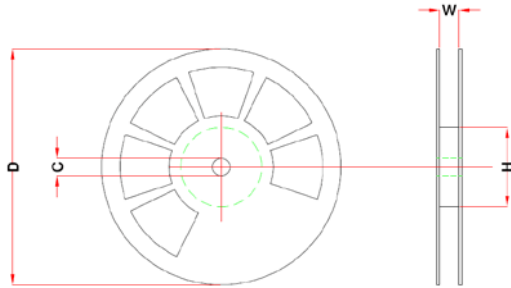
## 13-2 Tape characteristics

W	F	E1	P0	P1	P2	A0	B0	K0	SO	T	D0
24+/- 0.3	11.5+/- 0.1	1.75+/- 0.1	4+/- 0.1	12+/- 0.1	2+/- 0.1	6.4+/- 0.1	11.4+/- 0.1	3.6+/- 0.1	23+/- 0.1	0.4+/- 0.1	1.5+/- 0.1

Quantity	Leading Space	Trailing Space
1000 pcs/reel	35 blank antenna holders	35 blank antenna holders

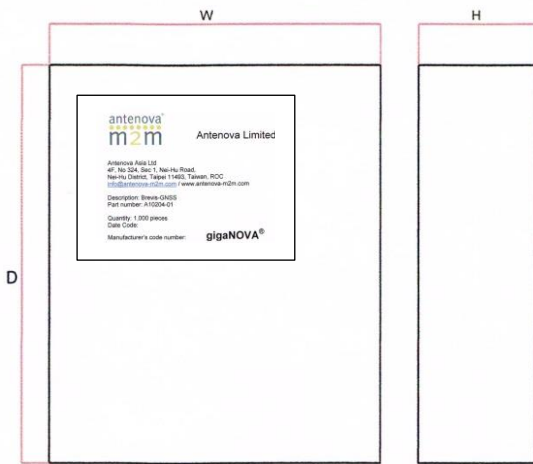


### 13-3 Reel dimensions



Width (W)	Reel Diameter (D)	Hub Diameter (H)	Shaft Diameter (C)
24.75mm	330+/-2.0mm	98.4mm	13+/-0.5mm

### 13-4 Box dimensions

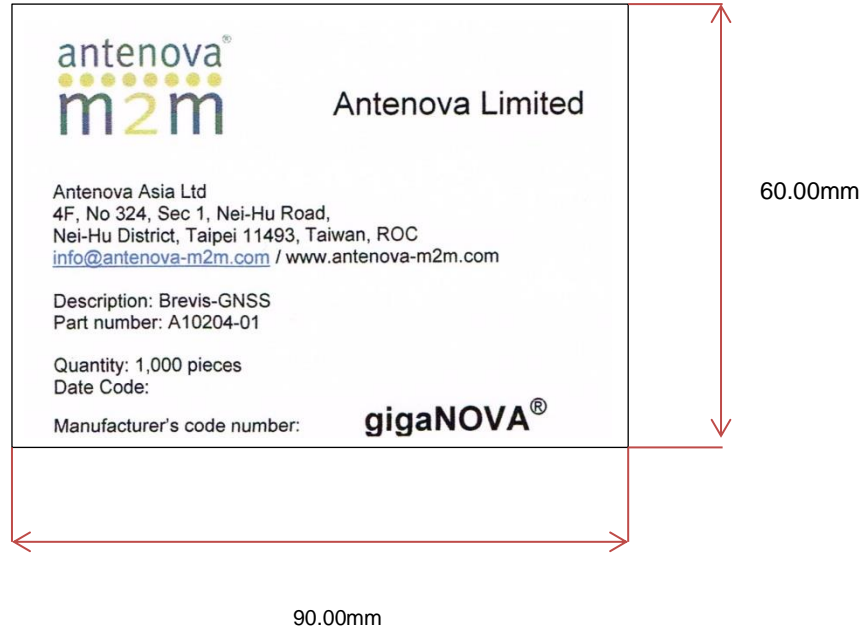


Width W	Breadth B	Thickness H
375mm	355mm	70mm

### 13-5 Bag properties

Reels are supplied in a vacuum sealed ESD aluminium bag.

### 13-6 Reel label information





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Certificate No: 4598

**Antennas for Wireless M2M Applications**

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