

# Fusca 2.4 GHz SMD Antenna

Part No. A10192

gigaNOVA<sup>®</sup>

Product Specification

## 1 Features

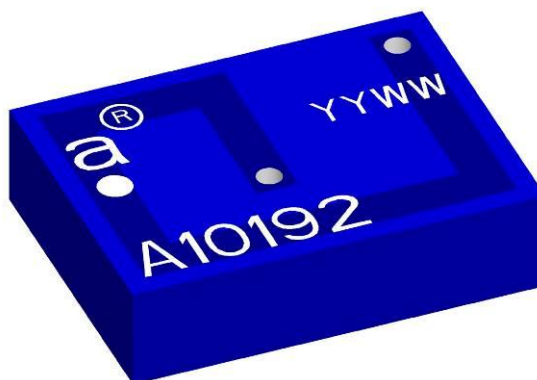
- Designed for 2.4 GHz applications: Bluetooth<sup>®</sup>, Wi-Fi<sup>®</sup> (802.11a/b/g/n), ZigBee<sup>®</sup>, etc. as well as 2.3 GHz WiMAX<sup>™</sup>, 2.5 GHz WiMAX<sup>™</sup> and WiBro.
- Easy to integrate
- Low profile design for use with no ground beneath the antenna
- High efficiency
- Light weight
- Intended for SMD mounting
- Supplied in tape on reel

## 2 Description

Fusca is intended for use with all 2.4 GHz applications. The antenna uses a ground plane in order to radiate efficiently, but this ground plane must not extend underneath the antenna itself.

## 3 Applications

- Mobile phones
- PDAs
- PNDs
- Headsets
- PMPs / MP3s
- Laptops
- PC-Cards
- Medical devices
- Sensors



## 4 Part number

**Fusca: A10192**



## 5 General data

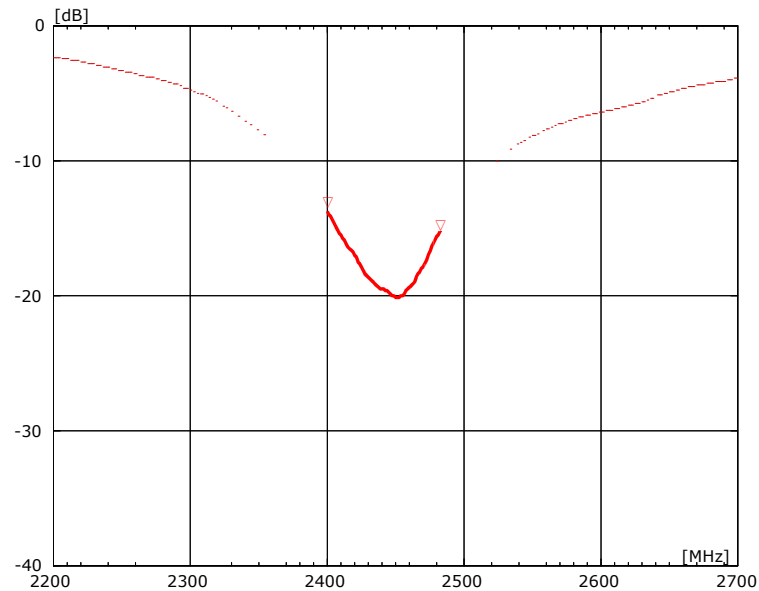
Product name	Fusca 2.4 GHz
Part Number	A10192
Frequency	2.4 – 2.5 GHz
Polarization	Linear
Operating temperature	-40 °C to +85 °C
Impedance with matching	50 $\Omega$
Weight	< 0.03 g
Antenna type	SMD
Dimensions	4 x 3 x 1.1 [mm]

## 6 Electrical characteristics

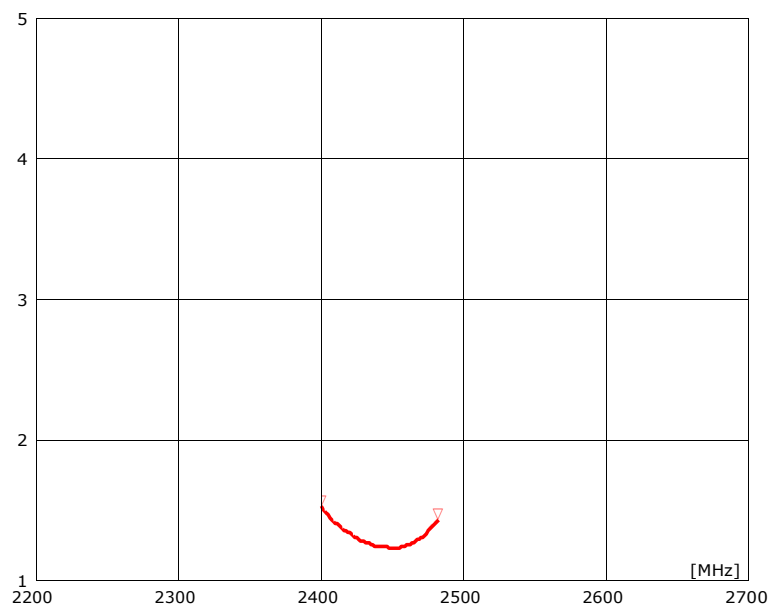
	Typical performance	Conditions
Peak gain	0.8 dBi	All data measured on Antenova's reference board, part number A10192-U1  Data given for the 2.4 – 2.5 GHz frequency range
Average gain	-1.9 dBi	
Average efficiency	65%	
Maximum Return Loss	-10 dB	
Maximum VSWR	2:1	

## 7 Electrical performance

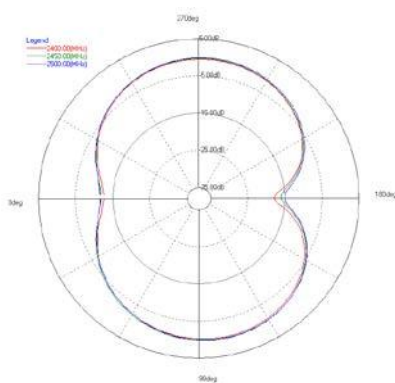
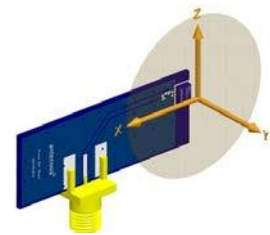
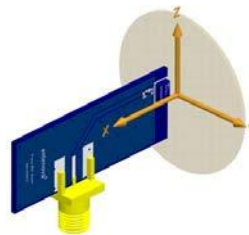
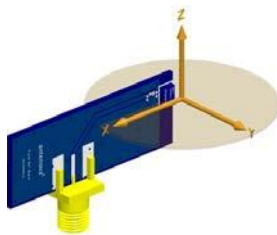
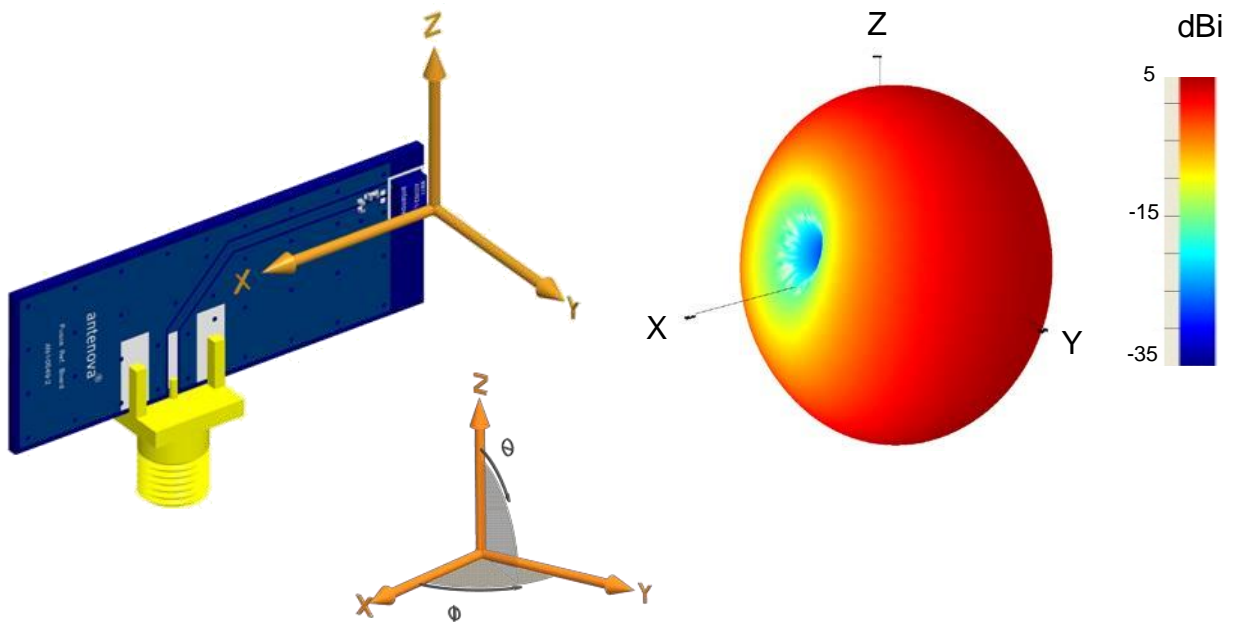
### 7-1 Return Loss



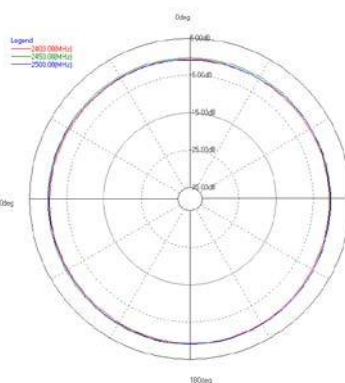
### 7-2 VSWR



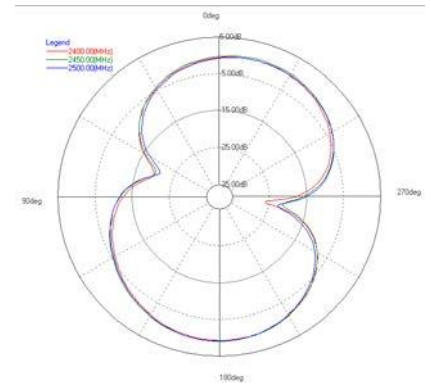
### 7-3 Antenna patterns



XY plane



ZY plane

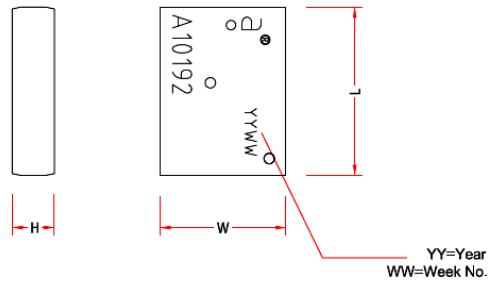


XZ plane

Patterns show combined polarisations  
measured on reference board A10192-U1

## 8 Antenna dimensions

### Fusca

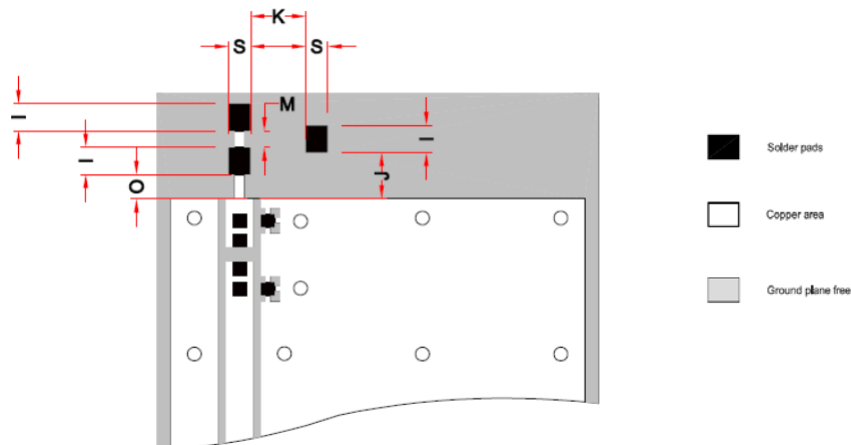


L	W	H
Length	Width	Height
$4.0 \pm 0.2$	$3.0 \pm 0.2$	$1.1 \pm 0.2$

Dimensions in mm

## 9 Antenna footprint

### Fusca (Part No: A10192)



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

I	S	O	J	M	K
$1.0 \pm 0.1$	$0.8 \pm 0.1$	$\geq 0.9 \pm 0.1$	$1.7 \pm 0.1$	$0.6 \pm 0.1$	$2.0 \pm 0.1$

Dimensions in mm

## 10 Electrical interface

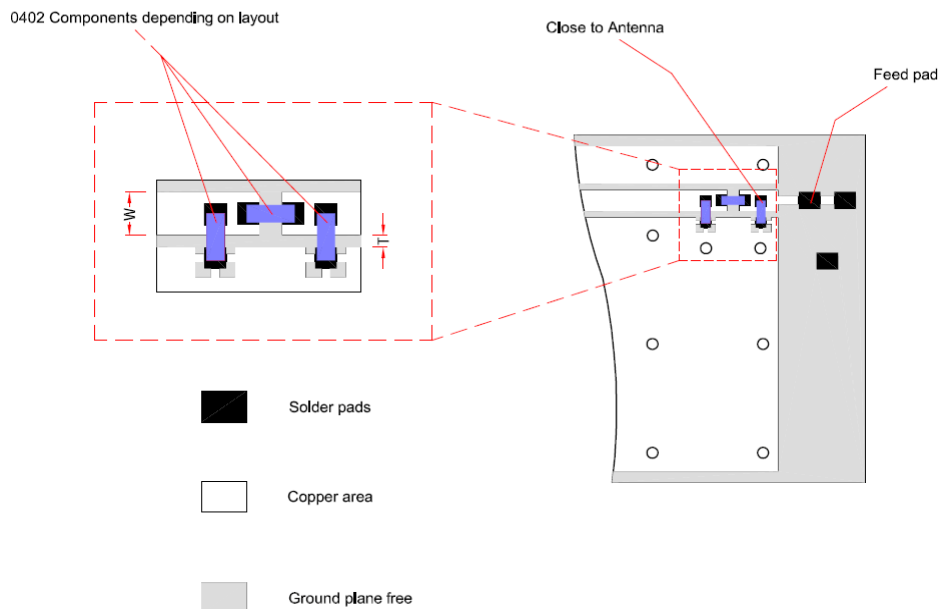
### 10-1 Transmission lines

- 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 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 and the following pad layout should be designed into the device so the correct circuit can be installed:



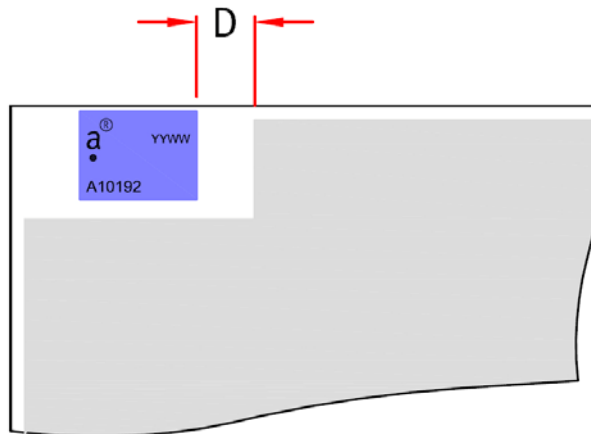
The antenna feed pad is indicated in the drawing above. Additional pads are for mechanical attachment only and should not be grounded.

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

### 10-3 Antenna placement

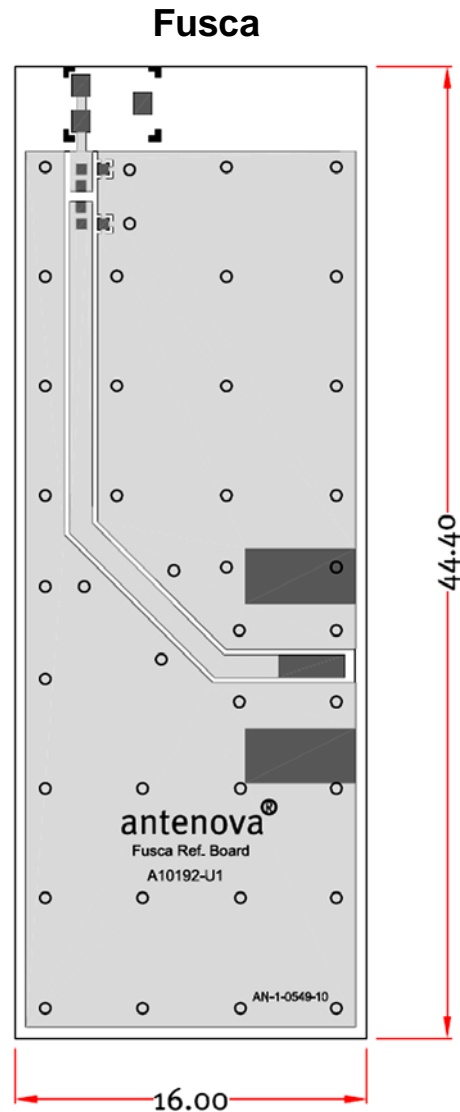
Antenova M2M strongly recommends placing the antenna near the edge of the board. Maximum antenna performance is achieved by placing the antenna towards one of the corners of the PCB and with the feed point of the antenna as close to same corner of the PCB as possible.



Additional ground and components near the antenna should be at a distance of at least 2 mm. Where possible the antenna should be clear of ground from both sides, although the antenna can work well with a minimum clearance of  $D \geq 2$  mm as shown in the drawing above.

## 10-4 Reference boards

The reference board has been designed for evaluation purposes of Fusca 2.4 GHz and it includes a SMA female connector



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

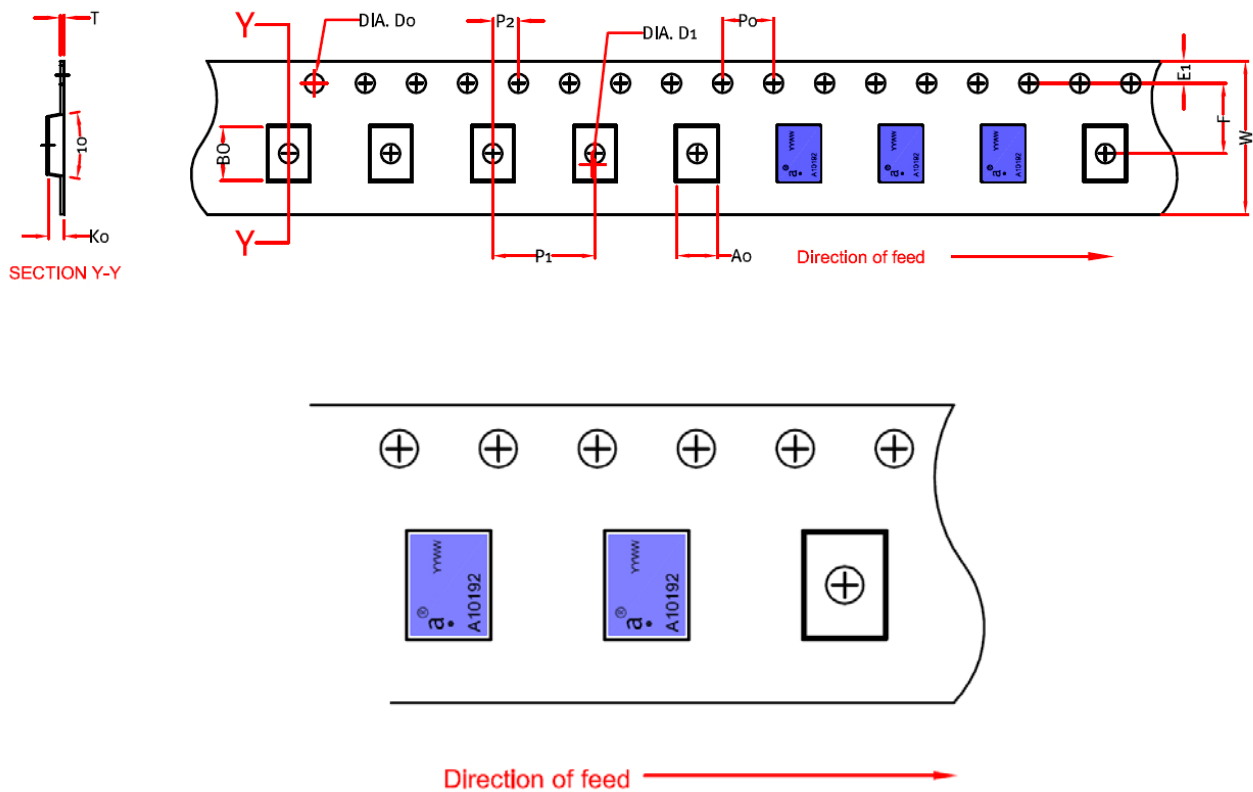
### 13-1 Optimal storage conditions for packaged reels

Temperature	-10°C to 40°C
Humidity	Less than 75% RH
Shelf Life	18 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.

## 13-2 Tape characteristics

### Fusca

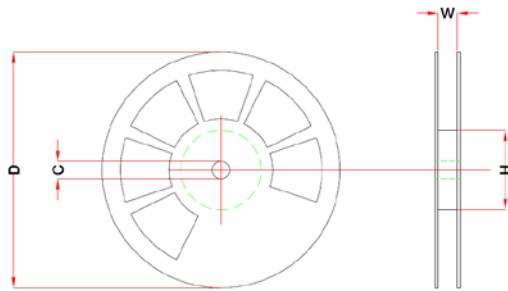


W	F	E1	P0	P1	P2	A0	B0	K0	T	D0	D1
$12 \pm 0.2$	$5.5 \pm 0.1$	$1.75 \pm 0.1$	$4 \pm 0.1$	$8 \pm 0.1$	$2 \pm 0.1$	$3.2 \pm 0.1$	$4.2 \pm 0.1$	$1.3 \pm 0.1$	$0.3 \pm 0.05$	Min 1.5	Min 1.5

Dimensions in mm

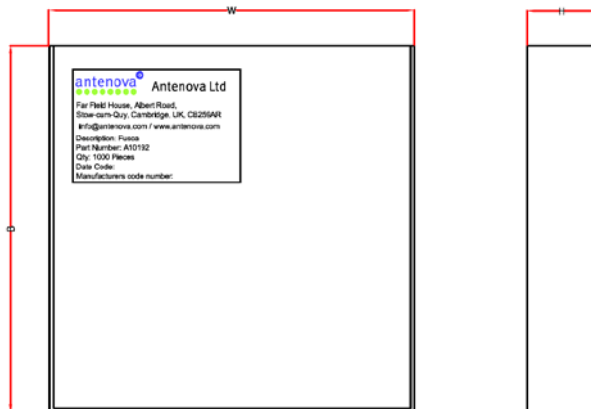
Quantity	Leading Space	Trailing Space
1000 pcs / reel	50 blank antenna holders	37 blank antenna holders

### 13-3 Reel dimensions



Width	Reel Diameter	Hub Diameter	Shaft Diameter
14 mm	178 mm	60 mm	13.2 mm

### 13-4 Box dimensions

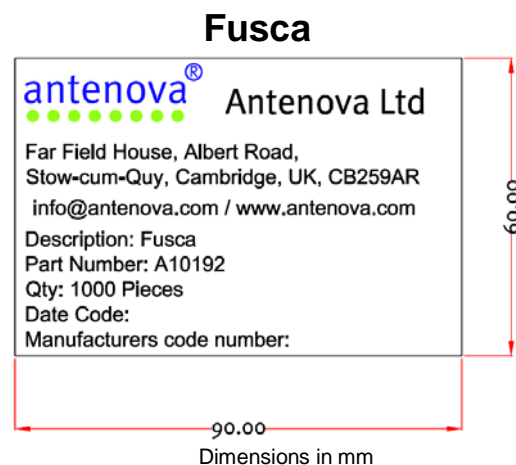


Width W	Breadth B	Thickness H
195 mm	195 mm	37 mm

### 13-5 Bag properties

Reels are supplied in protective plastic packaging

### 13-6 Reel label information



Antennas for Wireless M2M Applications



**[www.antenova-m2m.com](http://www.antenova-m2m.com)**

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**A111 + lens**

Antenna Datasheet v1.1



## Table of Contents

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## 1 Revision History

Revision	Comment
v1.0	Released version
V1.1	Updates in table 2.2





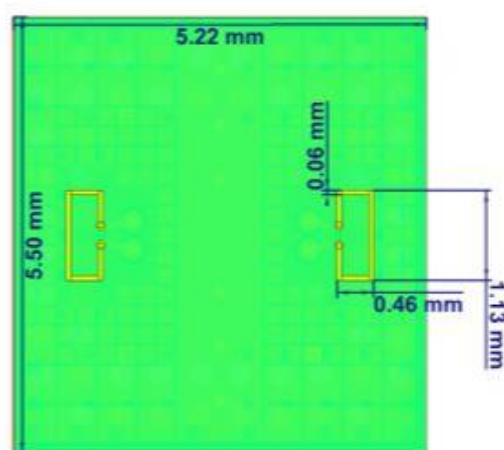
## 2 A111 Antenna specification

The antennas (Tx, Rx) are integrated in the A111 package (AiP).

A111 Antenna specification	Description
Number of antennas	1 Tx, 1 Rx
Type of antenna	Folded dipole antennas, integrated in package (AiP)
Frequency range	57-64 GHz
Antenna peak gain	6 dBi

*Table 2.1 A111 Antenna specification*

Antenna in Package (AiP) dimensions are shown in figure 2.1.



*Figure 2.1 A111 Antenna in Package (AiP) dimensions*



The A111 radiation pattern, Horizontal plane and Elevation plane, is shown in figure 2.2 and figure 2.3.

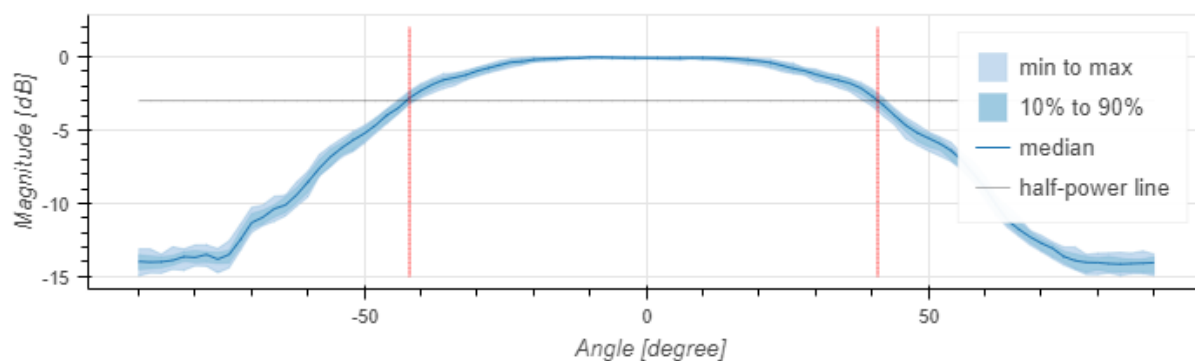


Figure 2.2 A111 normalized radiation pattern at H-plane

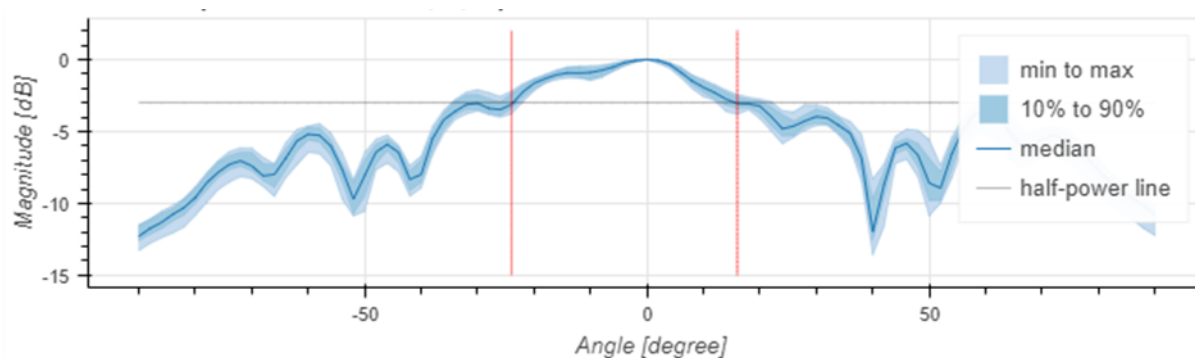


Figure 2.3 A111 normalized radiation pattern at E-plane



Figure 2.4. HBL lens diameter 36.3 mm and height 9 mm



Figure 2.5. FZP lens diameter 36.3 mm and height 7.8 mm

Table 2.2 Radiation properties of lenses, FS – Free space

<b>XR112 with LH112 holder</b>  Distance from PCB to Lens in D1 = 3mm	<b>Max. Gain (dB<sub>FS</sub>)</b>	<b>HPBW-E (degree)</b>	<b>HPBW-H (degree)</b>
	<b>D1*</b>	<b>D1*</b>	<b>D1*</b>
HBL	13	15	20
FZP	12	25	12

\*Other combinations of distance and lens that generated a gain below 13 dB will be possible



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