

# Product Specification

Rufa 2.4 GHz SMD Antenna





## gigaAnt Asia Pte Ltd

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**Company:**

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**Attention:**

**Date:** 13 August 2004

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**Re:** Lead-free & Hazardous Conformity for  
gigaAnt SMD antennas

**Pages:** 1

Dear Sir/Madam,

This is to certify that the following gigaAnt SMD series of 2.4GHz do not contain materials listed in the box below.

1. MICA (3030A5645-01)
2. LIMATA (3030A5725-01, 3030A731-01)
3. RUFA (3030A5839-01, 3030A5887-01)
4. IMPEXA (3030A6100-01, 3030A6200-01)

|                                         |                                          |
|-----------------------------------------|------------------------------------------|
| Cadmium and cadmium compound.           | Lead and lead compound                   |
| Organic brominated compound (PBB, PBDE) | Mercury and mercury compound             |
| Polychlorinated biphenyl (PCB)          | Sexivalent chrome compound               |
| Polychlorinated naphthalene (PCN)       | Chlorinated paraffin (CP)                |
| Organic tin compound                    | Mirex                                    |
| Asbestos                                | Formaldehyde                             |
| Azo compound                            | Tetra-bromo-bisphenol-A-bis (TBBP-A-bis) |

Best regards,

Yours sincerely,

Martin Jensen

Product Manager - gigaAnt AB

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## 1. FEATURES

- Designed for 2.4 GHz applications [Bluetooth™, WiFi™ (802.11b/g), Zigbee™, WiMedia™ etc.]
- Intended for SMD mounting
- Supplied in tape on reel

## 2. DESCRIPTION

The Rufa antenna is intended for use with all 2.4 GHz applications. The antenna requires a groundplane, i.e your device acts as an active part of the antenna and thus demand careful consideration concerning its placement

## 3. APPLICATION

- Mobile phones
- PDAs
- Headsets
- Laptops
- PC- Cards
- CF- Cards

## 4. MODEL NAMES

**30 30 A5839 - 01**

Drawing No.

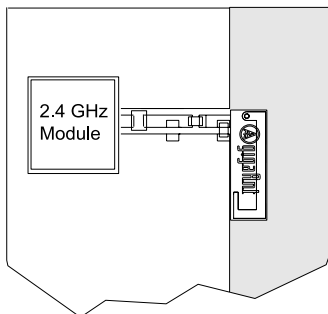
**Technology**

-PCB

**Antenna Family**

-SMD

Left feeding



**30 30 A5887 - 01**

Drawing No.

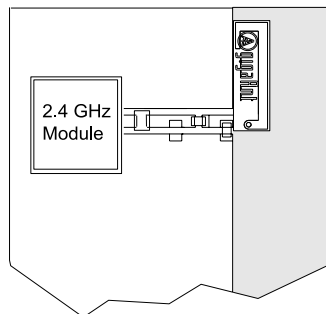
**Technology**

-PCB

**Antenna Family**

-SMD

Right feeding



## 5. GENERAL DATA

|                       |                      |
|-----------------------|----------------------|
| Product Name          | Rufa 2.4 GHz         |
| Article No.           | 3030A5839-01(Left)   |
|                       | 3030A5887-01 (Right) |
| Frequency             | 2.4-2.5 GHz          |
| Polarization          | Linear               |
| Operating temperature | -40 to + 85 degC     |
| Impedance             | 50 Ohm               |
| Weight                | 0.1 gram             |
| Antenna type          | SMD                  |

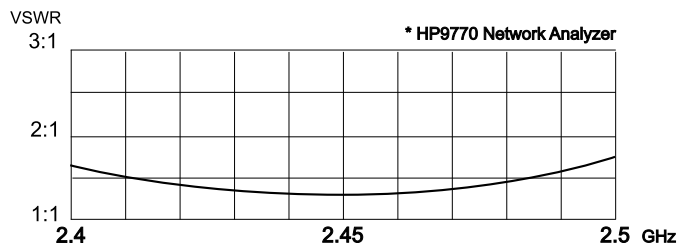
## 6. ELECTRICAL CHARACTERISTICS

|            | Characteristics |         |         | Conditions*                                                 |
|------------|-----------------|---------|---------|-------------------------------------------------------------|
|            | Min             | Typ     | Max     |                                                             |
| Peak Gain  | 4.0 dBi         | 4.1 dBi | 4.4 dBi | Frequency 2.4-2.5 GHz, Measured in 3D chamber ( near field) |
| Efficiency | 66%             | 68%     | 69%     |                                                             |
| VSWR       | 1.3:1           | 1.5:1   | 1.6:1   | Frequency 2.4-2.5 GHz, Measured in Network Analyzer         |

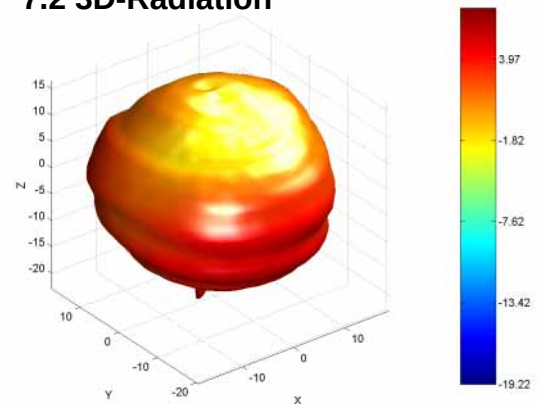
\*Note all data provided in this table are based on the gigaAnt reference board

## 7. ELECTRICAL PERFORMANCE

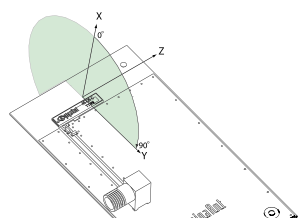
### 7.1 Voltage Standing Wave Ratio



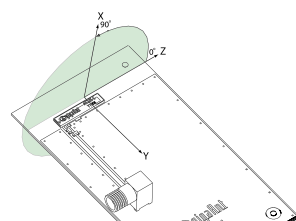
### 7.2 3D-Radiation



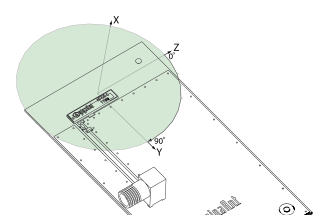
### 7.3 Radiation patterns



XY- Plane

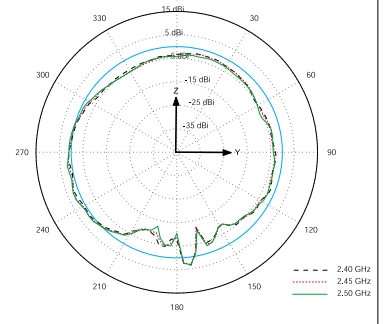
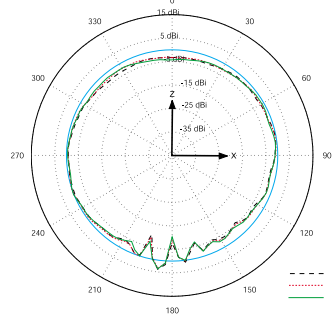
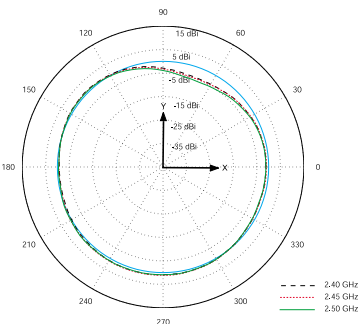


XZ- Plane

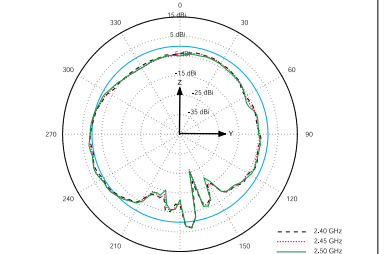
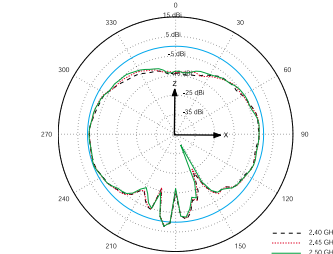
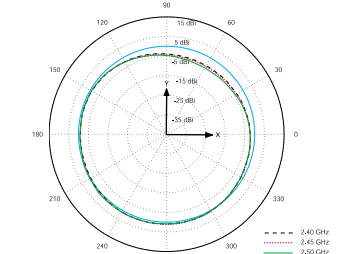


YZ- Plane

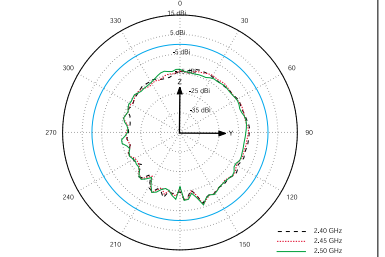
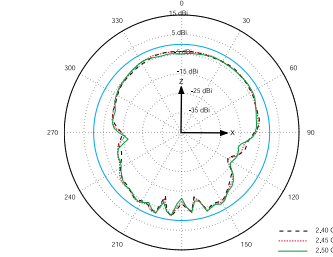
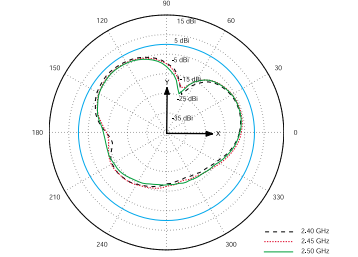
Total polarization



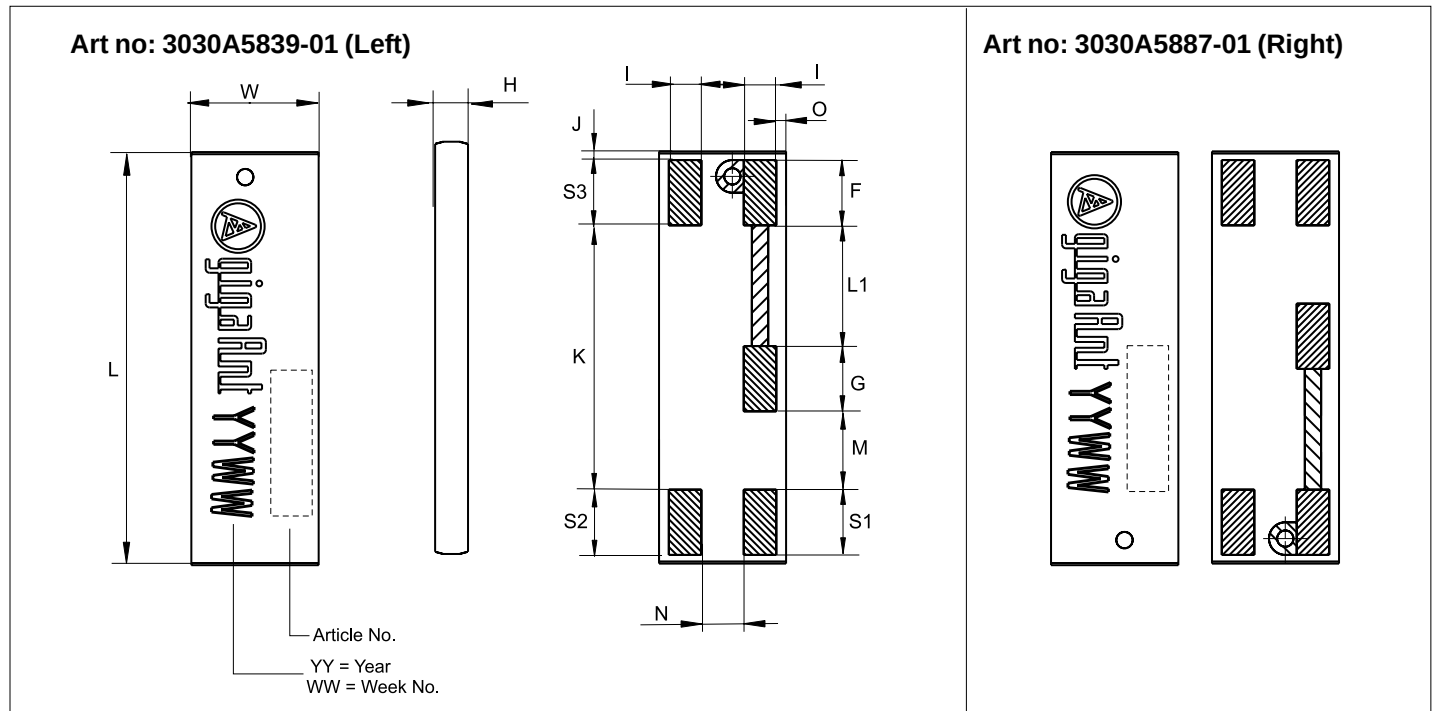
Vertical polarization



Horizontal polarization

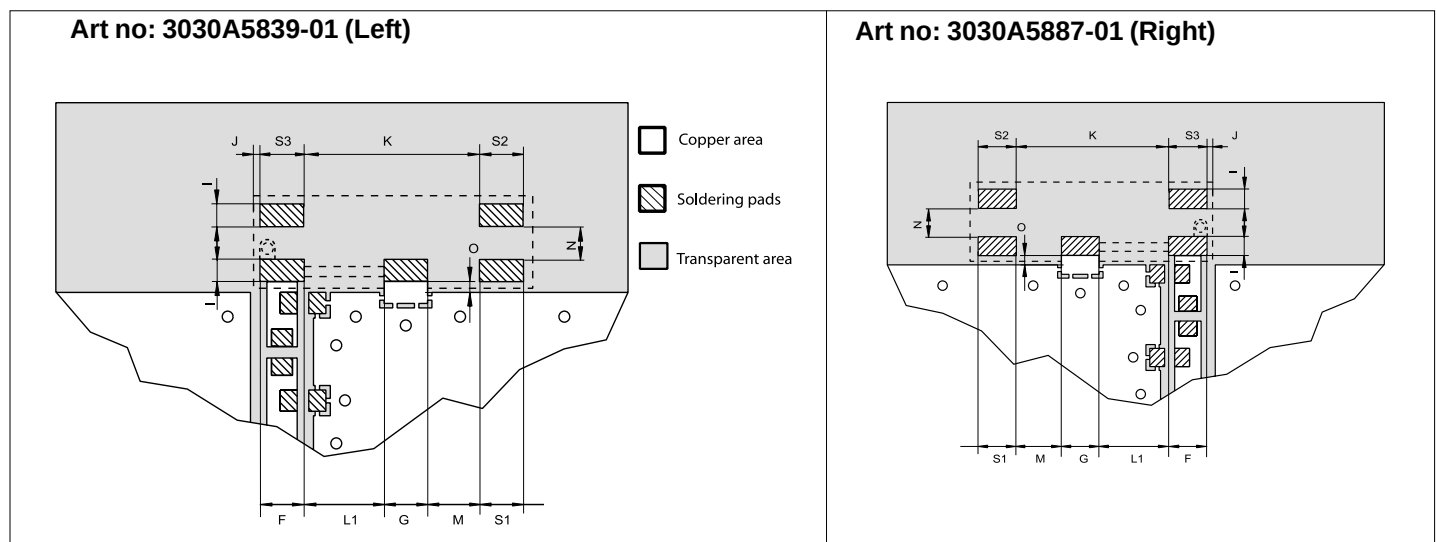


## 8. ANTENNA DIMENSIONS



| L                        | W        | H        | G       | F       | S1      | S2 | S3 | I       | J        | K       | L1      | M       | N       | O        |
|--------------------------|----------|----------|---------|---------|---------|----|----|---------|----------|---------|---------|---------|---------|----------|
| Length                   | Width    | Height   | Ground  | Feed    | Solder  |    |    |         |          |         |         |         |         |          |
| 12.8 ±0.2                | 3.9 ±0.2 | 1.1±0.15 | 2.0±0.1 | 2.0±0.1 | 2.0±0.1 |    |    | 1.0±0.1 | 0.25±0.1 | 8.1±0.1 | 3.7±0.1 | 2.4±0.1 | 1.3±0.1 | 0.3±0.15 |
| Dimensions in millimeter |          |          |         |         |         |    |    |         |          |         |         |         |         |          |

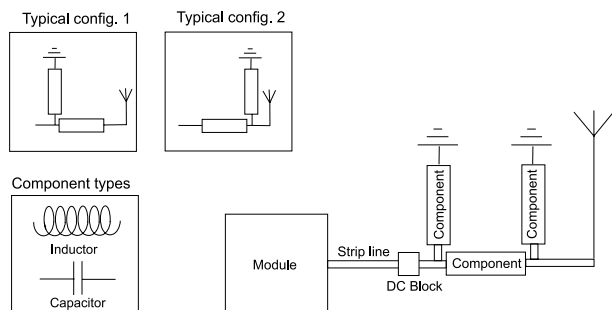
## 9. ANTENNA FOOT PRINT



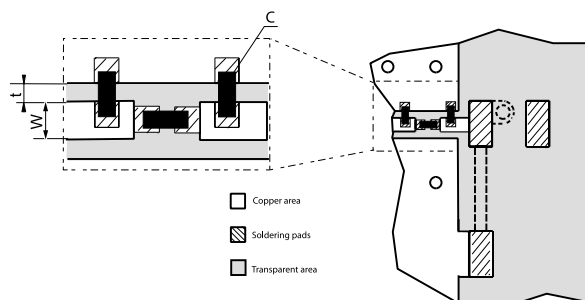
| G                         | F       | S1      | S2 | S3 | I       | J        | K       | L1      | M       | N       | O        |
|---------------------------|---------|---------|----|----|---------|----------|---------|---------|---------|---------|----------|
| Ground                    | Feed    | Solder  |    |    |         |          |         |         |         |         |          |
| 2.0±0.1                   | 2.0±0.1 | 2.0±0.1 |    |    | 1.0±0.1 | 0.25±0.1 | 8.1±0.1 | 3.7±0.1 | 2.4±0.1 | 1.3±0.1 | 0.5±0.15 |
| Dimensions in millimeters |         |         |    |    |         |          |         |         |         |         |          |

## 10. ELECTRICAL INTERFACE

### 10.1 Transmission line and matching



The matching network has to be individually designed using one, two or three components.

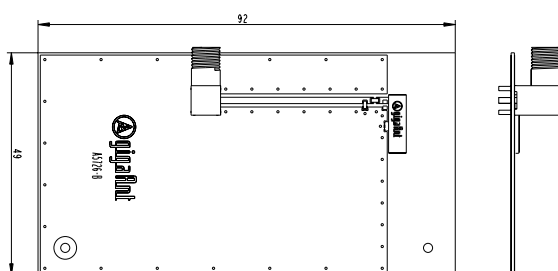


t, w = Unique dimensioning according to your PCB \*

C = Inductor and capacitor values according to your specific device\*

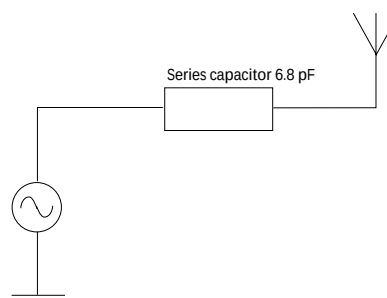
\* gigaAnt provides this service upon request

### 10.2 Test board dimensions



The testboard is designed for evaluation purposes for Rufa 2.4 GHz SMD antenna. The card has the same size as a typical PCMCIA card and is fitted with an SMA connector.

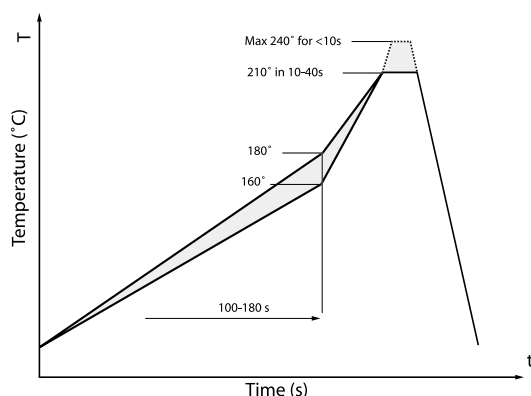
### 10.3 Test board matching



The testboard is matched with above specified component. Note! The component value(s) will vary depending on size of PCB, surrounding components etc.

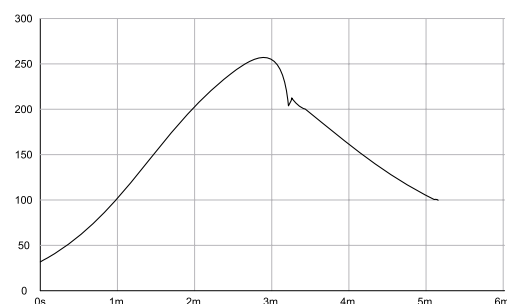
## 11. SOLDERING

### 11.1 Recommended soldering conditions



### 11.2 Leadfree soldering

The antenna has been tested and approved for leadfree soldering. The reflow curve and solder paste used is listed below.



Solder paste: KOKI S3X58-M405

## 12. RELIABILITY

### 12.1 Temperature and Humidity

| Item                          | Standard                                          | Low               | High      | Duration            |
|-------------------------------|---------------------------------------------------|-------------------|-----------|---------------------|
| Operating temperature         | EN/IEC 60068-2-2, Test Bd: Dry heat               | -30 degC          | +90 degC  | -                   |
| Temperature cycling           | EN/IEC 60068-2-14, Test Na: Change of temperature | -40 degC          | +90 degC  | 500 cycles / 10 min |
| Storage life Humidity         | EN/IEC 60068-2-1, Test Ca: Damp heat              | +60 degC / 90% RH |           | 500 h               |
| Storage life Low temperature  | EN/IEC 60068-2-1, Test Ad: Cold                   | -55 degC          | -         | 500 h               |
| Storage life High temperature | EN/IEC 60068-2-2, Test Bb: Dry heat               | -                 | +125 degC | 500 h               |

### 12.2 Mechanical

| Item      | Standard                               | Low                                                                                                                     | High | Duration                              |
|-----------|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------|------|---------------------------------------|
| Bending   | IEC 60068-2-21, Test Ue1: Bending      | Bending 1 mm at a rate of 1 mm/s with support at end of PCB<br>1mm depth on reference board                             |      |                                       |
| Shear     | IEC 60068-2-21, Test Ue3: Shear        | Force of 5 N applied to the side of the antenna.                                                                        |      |                                       |
| Drop test |                                        | Dummy weight: 150g<br>Height: 170cm                                                                                     |      | One drop at each side, total drops: 6 |
| Vibration | EN/IEC 60068-2-6, Test Fc (sinusoidal) | Acceleration spectral density:10-1000Hz<br>Acceleration: 20m/s <sup>2</sup><br>Number of axes: 3 mutually perpendicular |      | 5 cycles per axis                     |

### 12.3 Miscellaneous

| Item          | Standard                   | Low                                                                                                    | High | Duration |
|---------------|----------------------------|--------------------------------------------------------------------------------------------------------|------|----------|
| Solderability | EN/IEC 60068-2-58, Test Td | Visual inspection of soldering pads.<br>Estimation of how many % of the pads that are well tin plated. |      |          |

### 12.4 Judgement standard

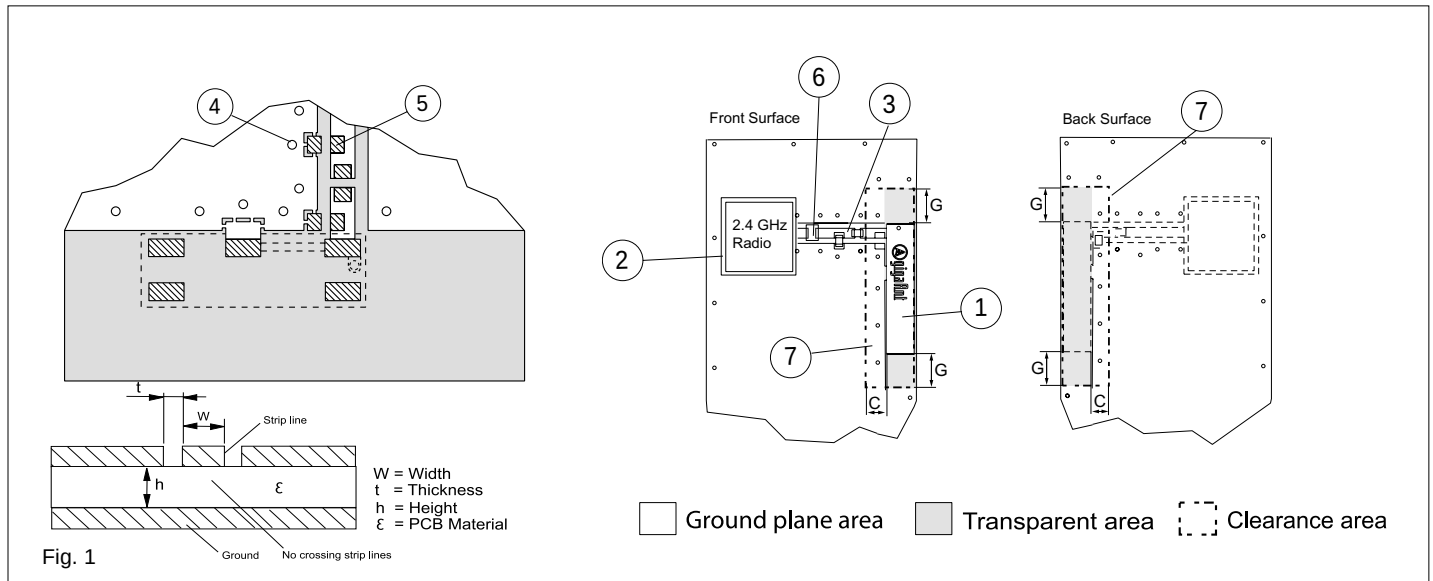
The judgement of the above tests should be made as follows:

1. Visual inspection - Normal appearance with no obvious cracking, peeling-off.
2. Electrical inspection - The DUT satisfies the VSWR specification throughout the 2.4-2.5 GHz band

## 13. HAZARDOUS MATERIAL REGURATION CONFORMANCE

|                                         |                                          |
|-----------------------------------------|------------------------------------------|
| Cadmium and cadmium compound.           | Lead and lead compound                   |
| Organic brominated compound (PBB, PBDE) | Mercury and mercury compound             |
| Polychlorinated biphenyl (PCB)          | Sexivalent chrome compound               |
| Polychlorinated naphthalene (PCN)       | Chlorinated paraffin (CP)                |
| Organic tin compound                    | Mirex                                    |
| Asbestos                                | Formaldehyde                             |
| Azo compound                            | Tetra-bromo-bisphenol-A-bis (TBBP-A-bis) |

## 14. APPLICATION EXAMPLE



### General

The antenna is of a quarter wave type and is dependent on the groundplane area to complete the antenna function. The antenna performance is also dependent on the size of the groundplane and the transparent area.

#### 1. Placement of the antenna

The antenna shall be placed on a transparent area without underlying groundplane at the edge of the PCB oriented as above. Groundplane area surrounding the antenna should be with a clearance of  $G=3-5$  mm.

#### 2. Placement of 2.4 GHz module

To avoid losses in the strip line, the module shall be placed as close to the antenna as possible.

#### 3. Strip line

The strip line must be dimensioned according to your specific PCB. (see fig 1). No crossing strip lines are allowed between the strip line and its ground plane.

#### 4. Via Connections

To avoid spurious effects via connections must be made to analogue ground.

#### 5. Component matching

Component values are depending on antenna placement, PCB dimensions and location of other components.

#### 6. DC Block

Might be needed depending on RF Module configuration.

#### 7. Clearance

No components allowed within the clearance area with a minimum distance to other components,  $C=3-5$  mm.

#### 8. Casing material

No metal casing or plastics using metal flakes should be used, avoid also metallic based paint or laquer. Keep a minimum clearance of 1mm between the antenna and the casing.

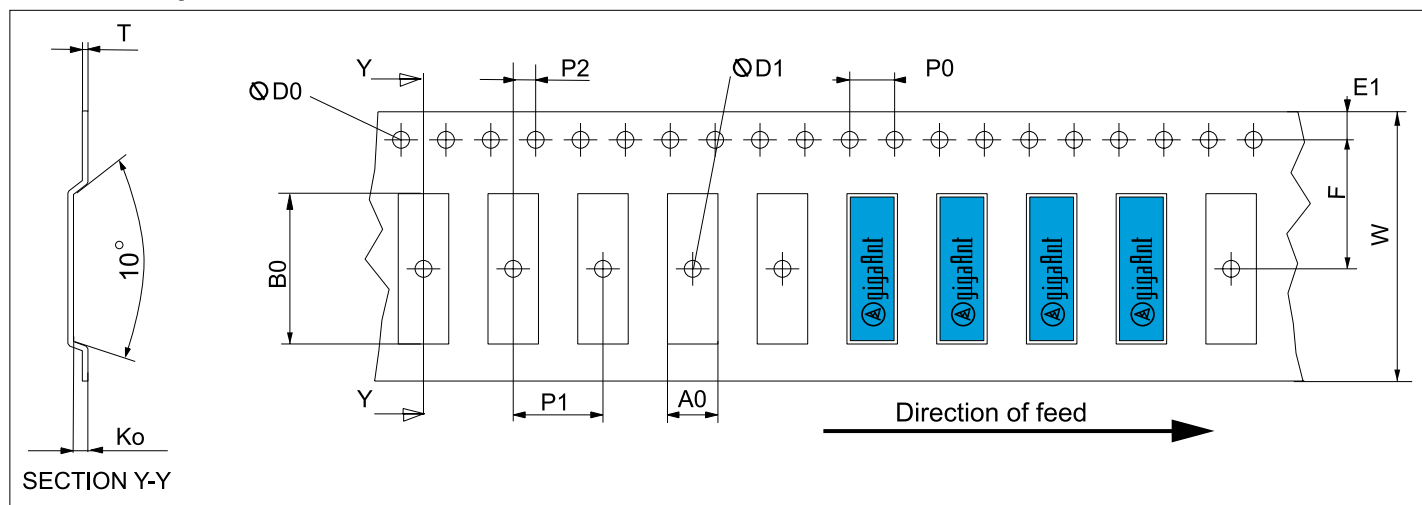
**Note ! Incorrect implementation of the antenna will affect the performance.  
Contact gigaAnt for implementation services.**

## 15. PACKAGING

### 15.1 Shelf storage recommendation

|               |                                             |
|---------------|---------------------------------------------|
| Temperature   | -10 to +40 degree C                         |
| Humidity      | Less than 75% RH                            |
| Shelf Life    | 18 Months                                   |
| Storage place | Away from corrosive gas and direct sunlight |

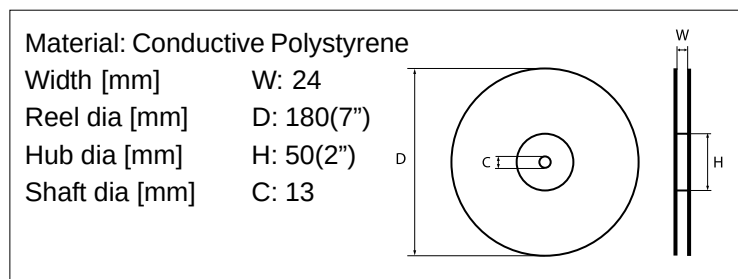
### 15.2 Tape characteristics



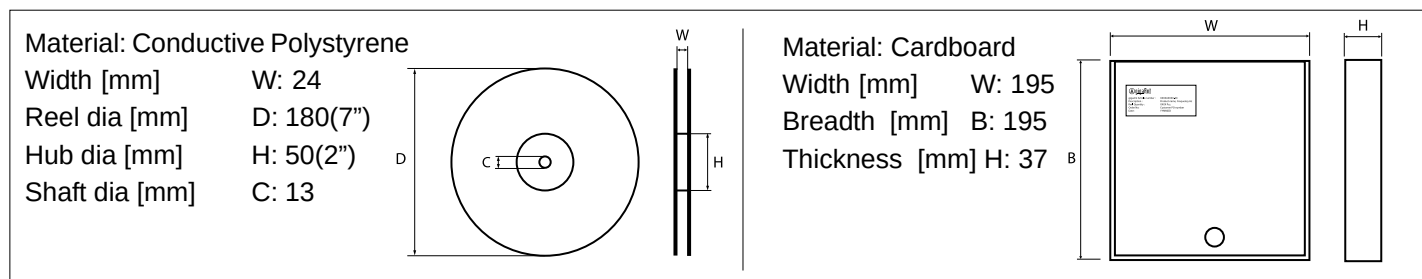
| W                        | F         | E <sub>1</sub> | P <sub>0</sub> | P <sub>1</sub> | P <sub>2</sub> | A <sub>0</sub> | B <sub>0</sub> | K <sub>0</sub> | T        | D <sub>0</sub> | D <sub>1</sub> |
|--------------------------|-----------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------|----------------|----------------|
| 24±0.3                   | 11.5 ±0.1 | 1.75±0.1       | 4.0±0.1        | 8.0±0.1        | 2.0±0.1        | 4.5±0.1        | 13.4±0.1       | 1.5±0.1        | 0.3±0.05 | 1.5±0.1        | 1.5±0.1        |
| Dimensions in millimeter |           |                |                |                |                |                |                |                |          |                |                |

| Quantity        | Leading space            | Trailing space           |
|-----------------|--------------------------|--------------------------|
| 1000 Pcs / reel | 50 blank antenna holders | 37 blank antenna holders |

### 15.3 Reel dimension



### 15.4 Box dimension



### 15.5 Bag properties

|                                                                     |                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Antistatic Aluminium Moisture Barrier Bag<br>Thickness [mil] T: 3.2 | <br>gigaAnt Article number : XXXXXXXX-XX<br>Description : Product name, Frequency Hz<br>Reel Quantity : XXXX Pcs.<br>Order No: Customer PO number<br>Date: YYYYMMDD |
|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 15.6 Reel label information

**16. CONTACT INFORMATION****[www.gigaAnt.com](http://www.gigaAnt.com)**Europe & Africae-mail: [info.EU@gigaAnt.com](mailto:info.EU@gigaAnt.com)

Tel: +46 46 286 4177

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Or your local gigaAnt representative