

# Prepared for :

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## **SMD Antenna Datasheet**

**Model: AB-S1003**

**Applicable Frequency Bands:**

**433MHz / 490MHz / 868MHz / 915MHz**

**NB-IoT Band 5 & Band 8**

**Lora/ Sub-1g/ UHF**

Company Signature:



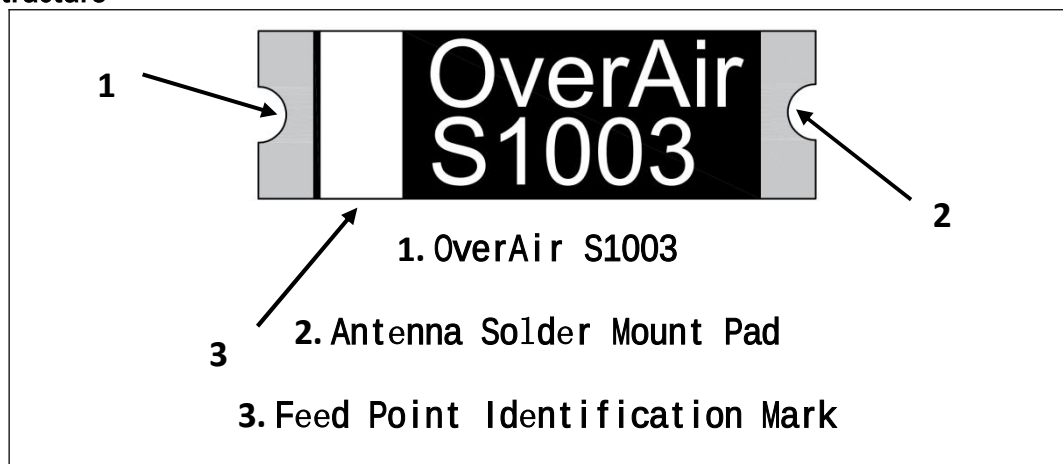
## Features

1. Compact dimensions of only 10.0×3.0×2.0 mm
2. Low energy loss with high antenna efficiency.
3. High stability under varying temperature and humidity conditions.

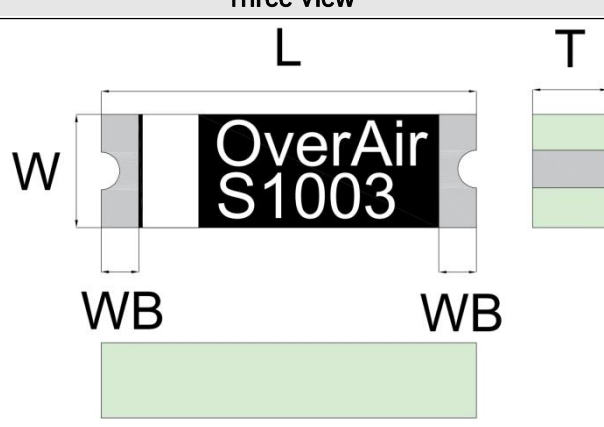
## Applications

1. Antenna applications for NB-IoT Band 5 and Band 8.
2. Antenna applications for LoRa 915 MHz, 868 MHz, 490 MHz, and 433 MHz.
3. Antenna applications for Sub-1GHz 915 MHz, 868 MHz, 490 MHz, and 433 MHz.
4. Antenna applications for UHF Band (400 MHz–800 MHz).

## Structure



## Dimensions

| Three View                                                                          |    | Symbol | Dimension (mm) |
|-------------------------------------------------------------------------------------|----|--------|----------------|
|  | L  | L      | 10.00±0.20     |
|                                                                                     | W  | W      | 3.00±0.20      |
|                                                                                     | T  | T      | 2.00±0.20      |
|                                                                                     | WB | WB     | 1.00±0.20      |

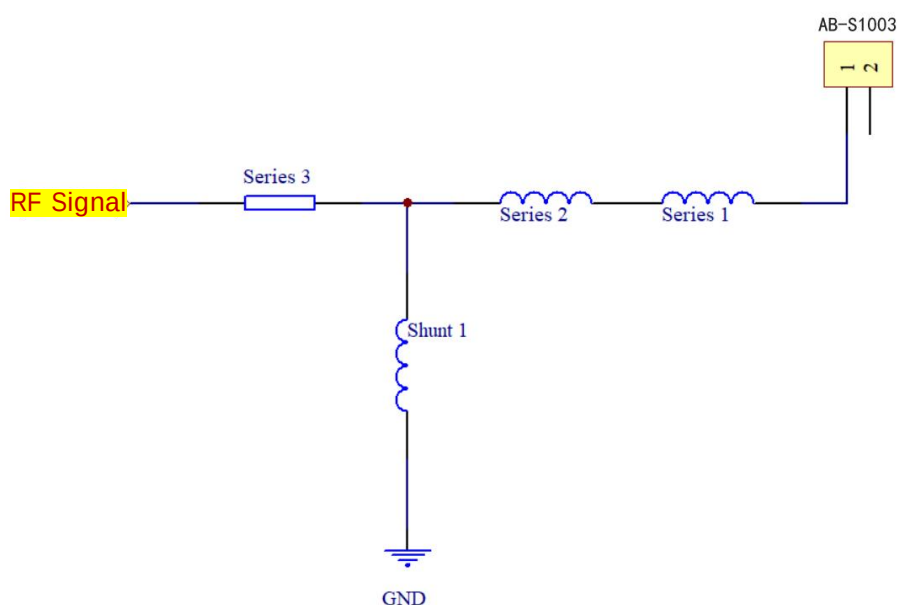
## Electrical Characteristic

| AB-S1003              | Specification                                    |
|-----------------------|--------------------------------------------------|
| Working Frequency     | 400-960MHz                                       |
| Impedance             | 50 $\Omega$                                      |
| Gain(dBi)             | 433M:0.31<br>490M:0.54<br>868M:1.12<br>915M:1.54 |
| VSWR                  | <1.5                                             |
| Operation Temperature | -40℃~+85℃                                        |
| Power Capacity        | 3W                                               |

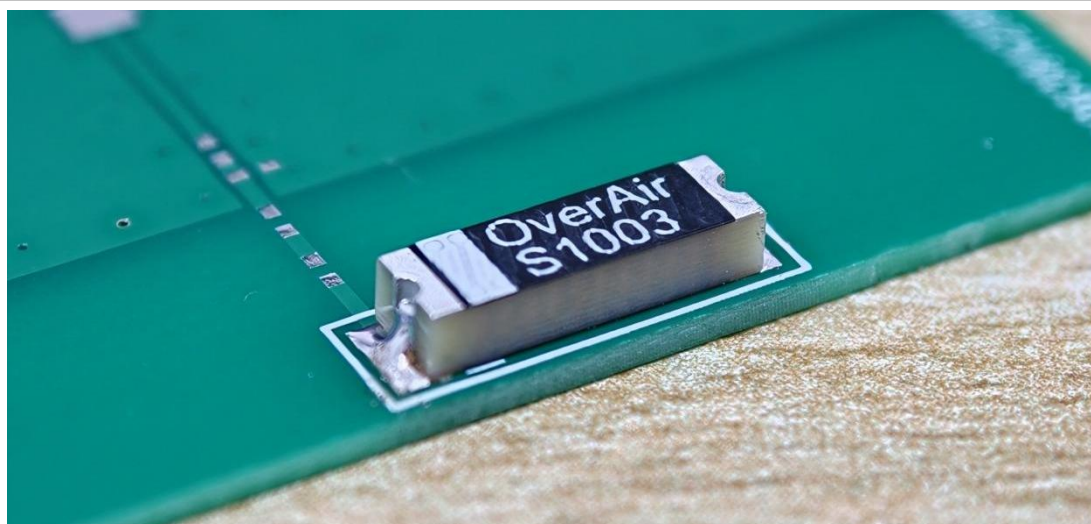
The operating frequency is achieved via impedance matching componnts.

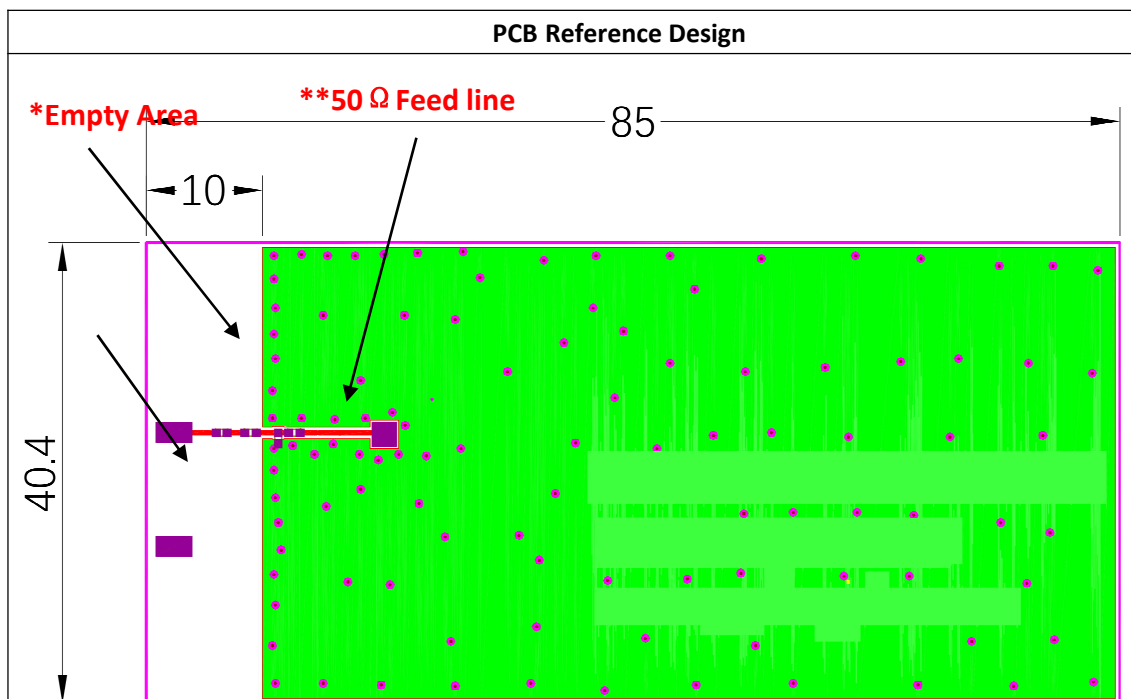
## Antenna Pad & Trace Design

### PCB Schematic Reference Design - AB-S1003



### Antenna Soldering Pattern





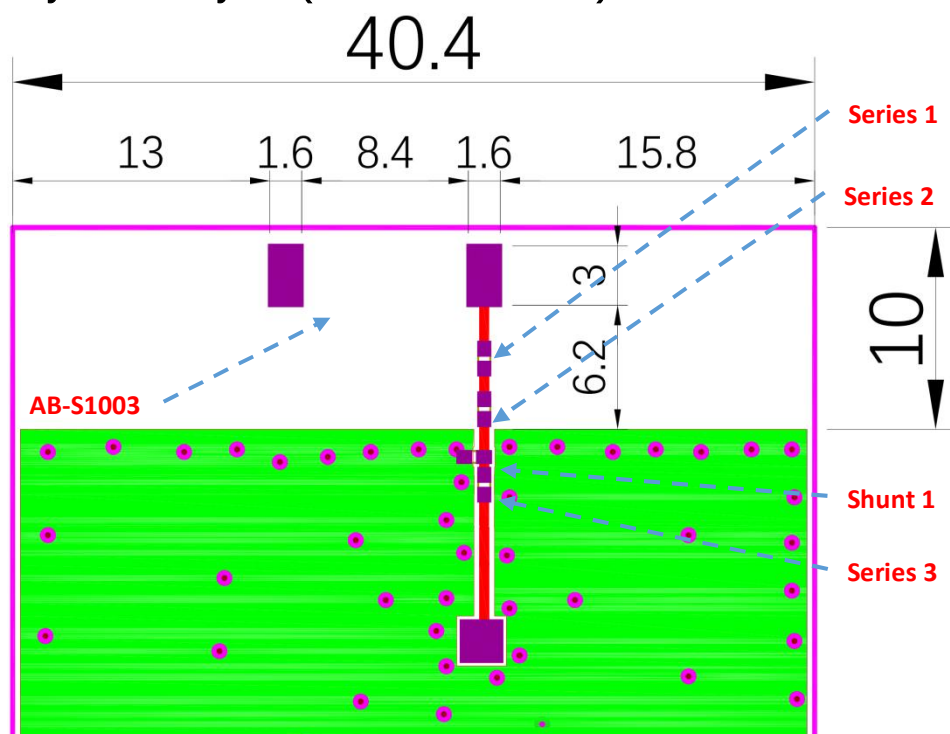
Unit : mm

- Ground
- 50Ω Transmission line
- Soldering Pad

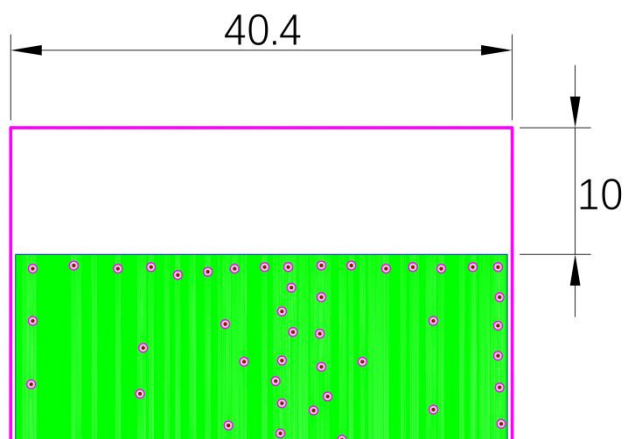
\*Empty Area: 40.4mm\*10mm zone must be kept clear on all layers-no copper pour and no trace.

\*\*50 Ω Feed line: The race impedance in the copper-poured area shall be 50Ω.

**Top-Layer PCB Layout (Dimension in mm) :**



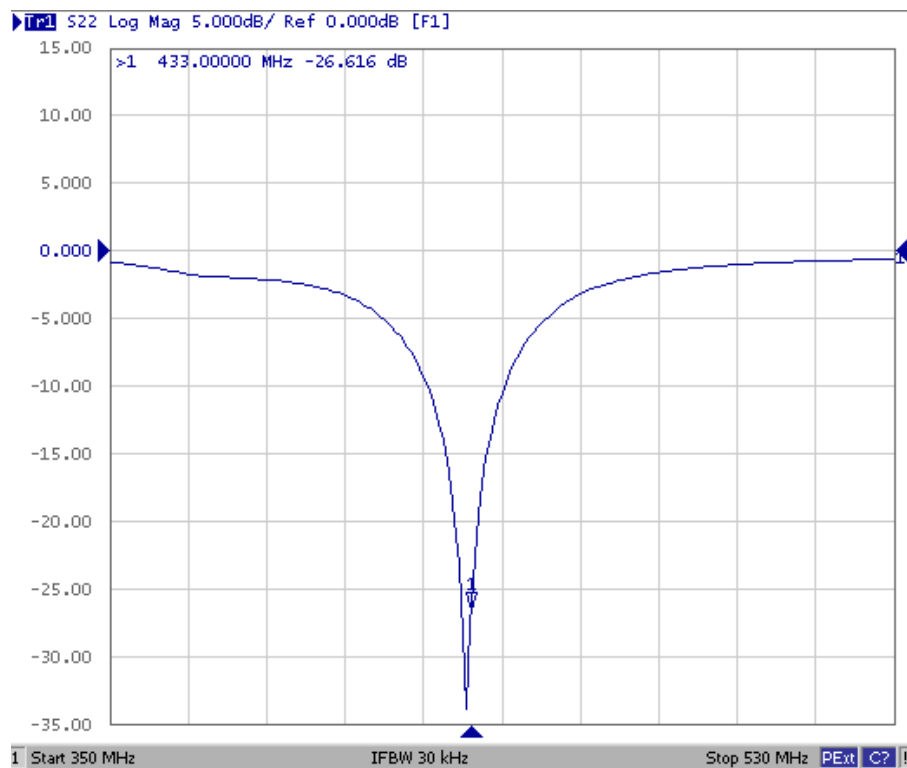
**Bottom-Layer PCB Layout (Dimensions in mm):**



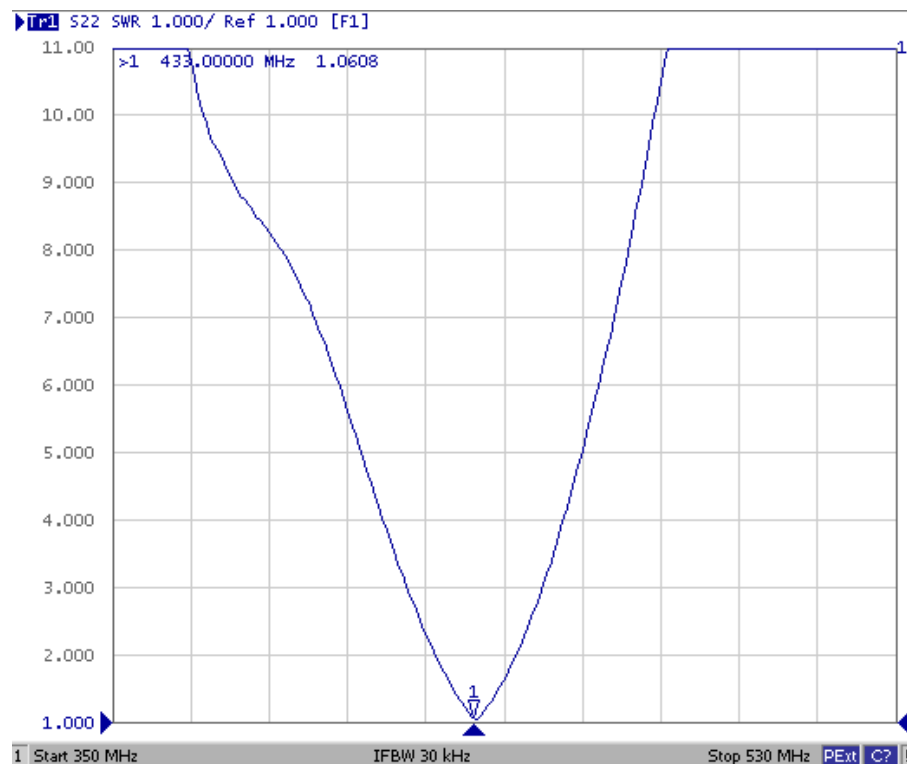
|                                          |               |                 |            |
|------------------------------------------|---------------|-----------------|------------|
| <b>Matching<br/>Component<br/>Values</b> | <b>433MHz</b> | <b>Series 1</b> | 120nH      |
|                                          |               | <b>Series 2</b> | 68nH       |
|                                          |               | <b>Shunt 1</b>  | NC         |
|                                          |               | <b>Series 3</b> | 0 $\Omega$ |
|                                          |               |                 |            |
|                                          | <b>490MHz</b> | <b>Series 1</b> | 120nH      |
|                                          |               | <b>Series 2</b> | 0 $\Omega$ |
|                                          |               | <b>Shunt 1</b>  | NC         |
|                                          |               | <b>Series 3</b> | 0 $\Omega$ |
|                                          |               |                 |            |
|                                          | <b>868MHz</b> | <b>Series 1</b> | 0 $\Omega$ |
|                                          |               | <b>Series 2</b> | 15nH       |
|                                          |               | <b>Shunt 1</b>  | 6.8nH      |
|                                          |               | <b>Series 3</b> | 0 $\Omega$ |
|                                          |               |                 |            |
|                                          | <b>915MHz</b> | <b>Series 1</b> | 0 $\Omega$ |
|                                          |               | <b>Series 2</b> | 5.6nH      |
|                                          |               | <b>Shunt 1</b>  | 6.8nH      |
|                                          |               | <b>Series 3</b> | 0 $\Omega$ |

## Antenna Testing on Evaluation Board (Board Thickness: 1.0 mm)

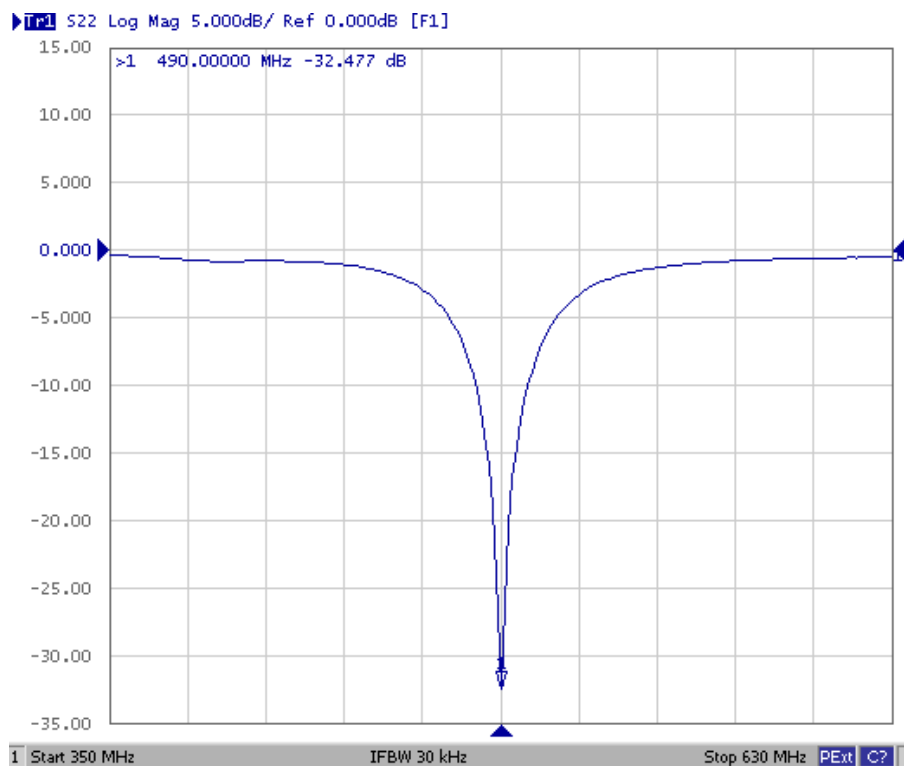
### Antenna S11 Characteristics @ 433 MHz



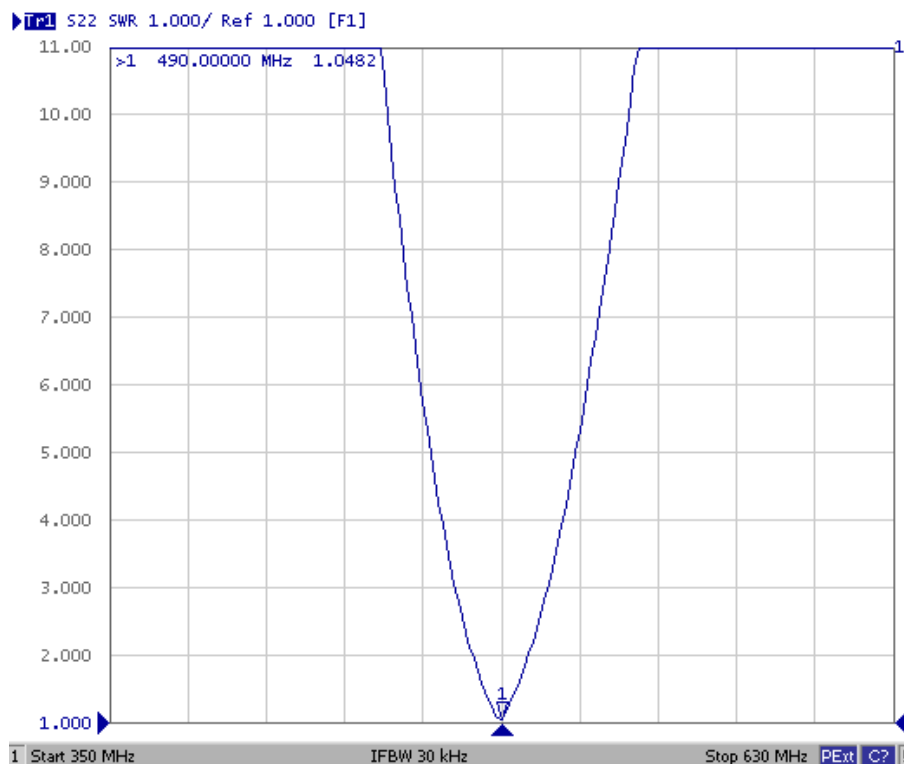
### Antenna VSWR Characteristic @433MHz



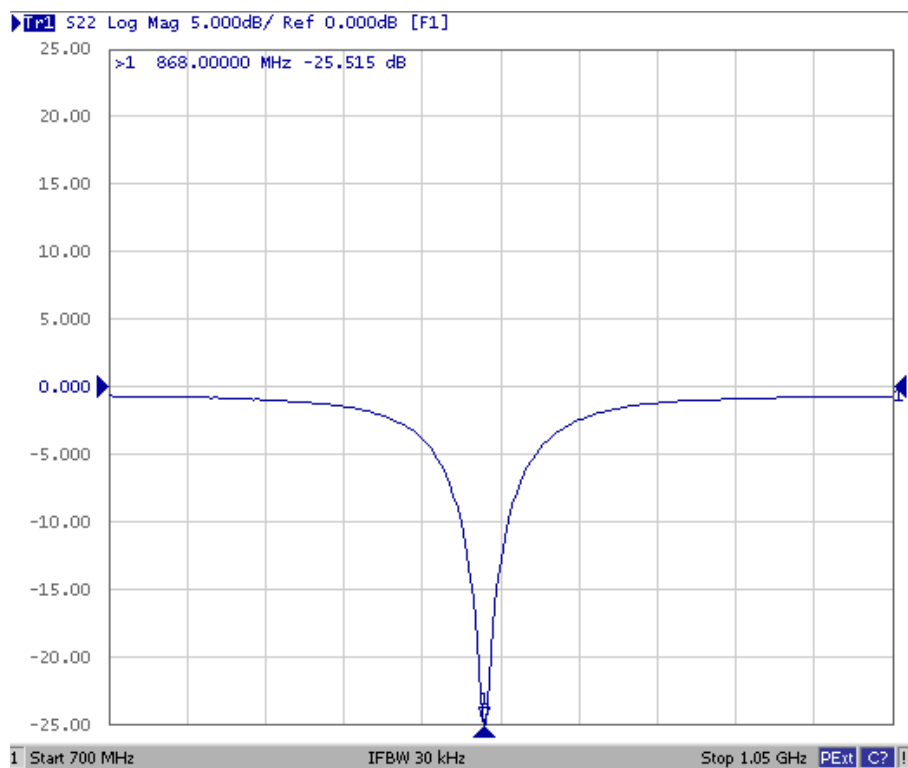
### Antenna S11 Characteristics @490MHz



### Antenna VSWR Characteristic @490MHz



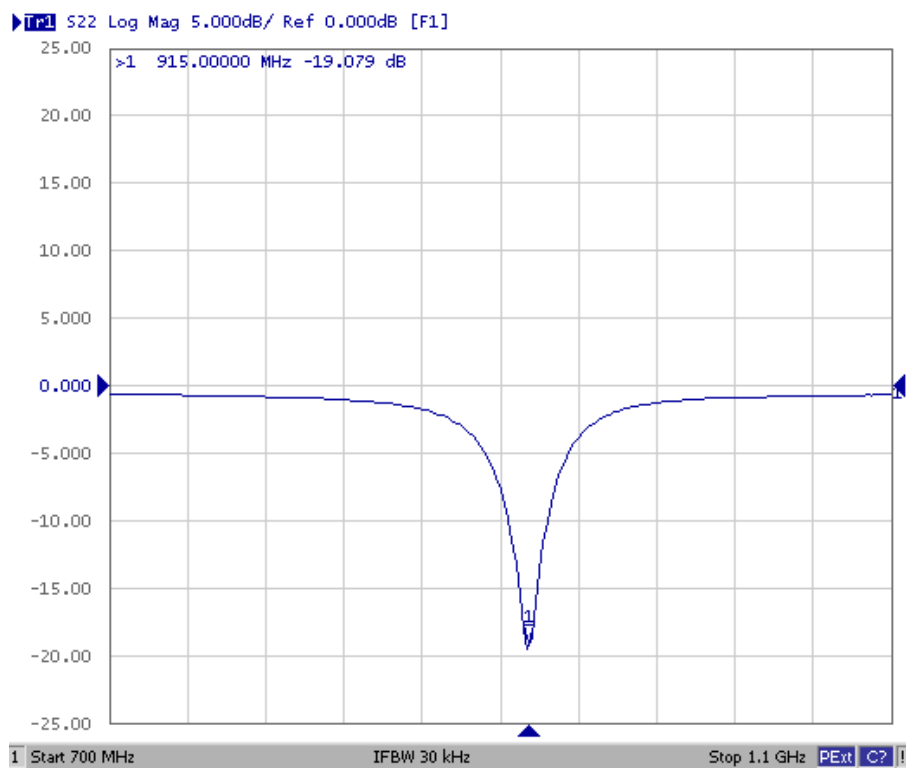
### Antenna S11 Characteristics @868MHz



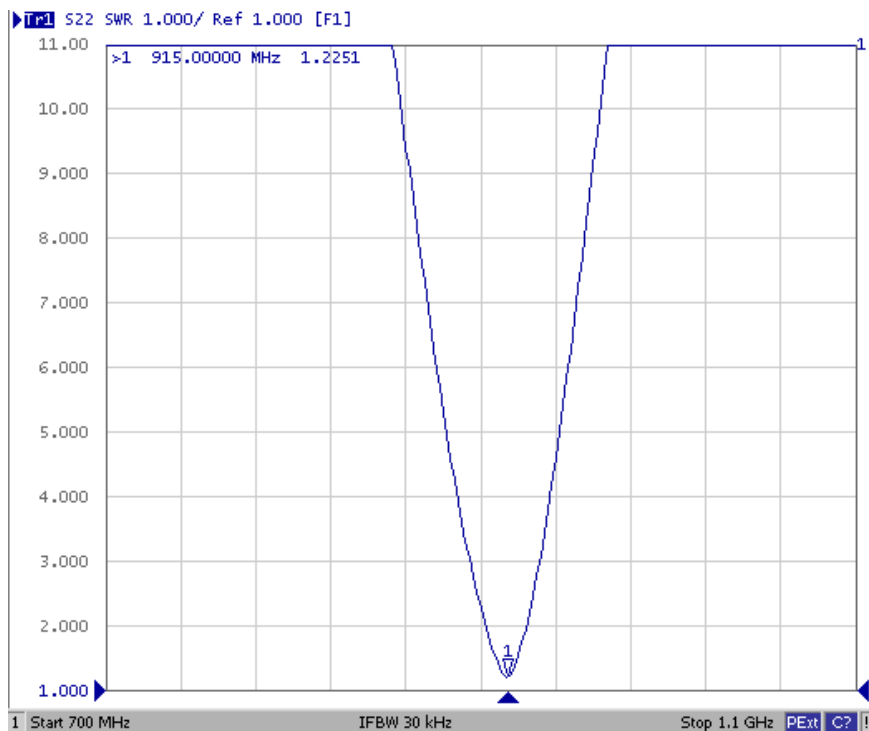
### Antenna VSWR Characteristic @868MHz



### Antenna S11 Characteristics @915MHz

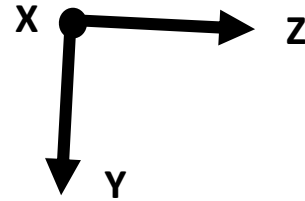
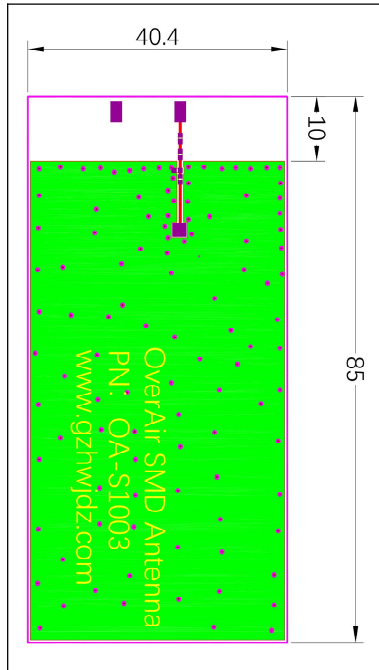


### Antenna VSWR Characteristic @915MHz

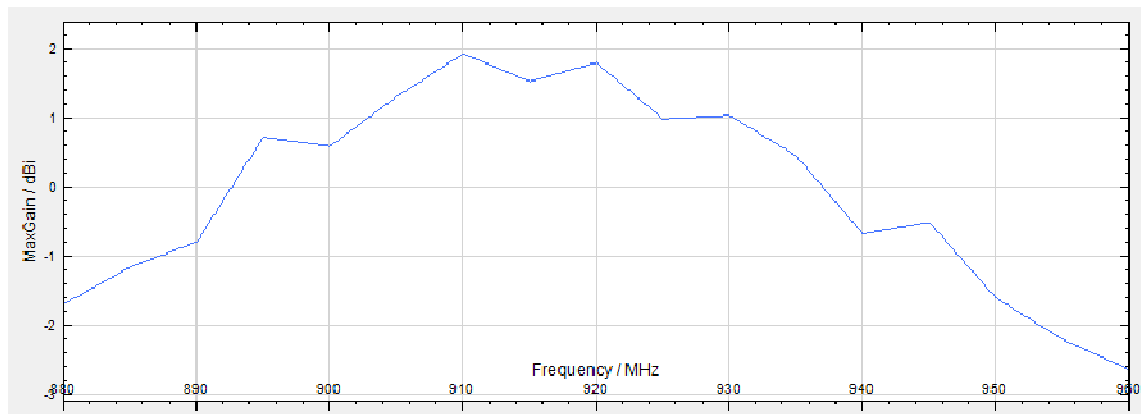
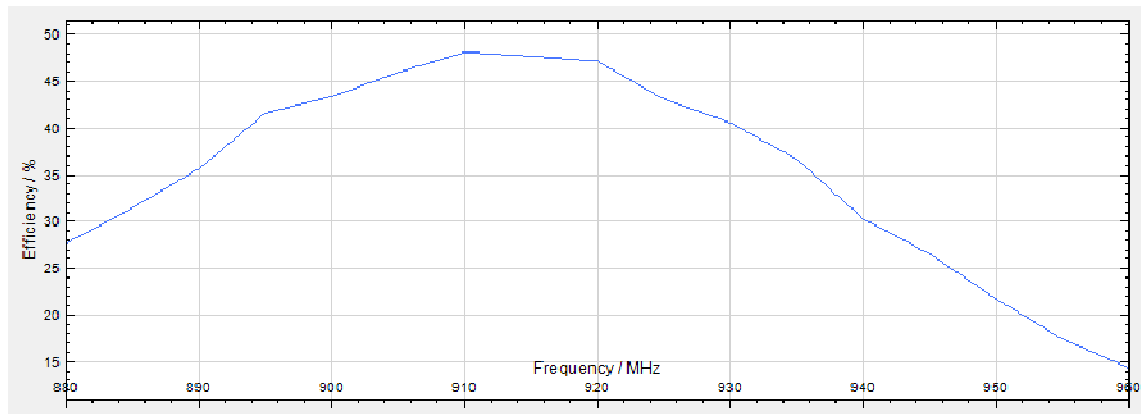


## Efficiency & Radiation Pattern

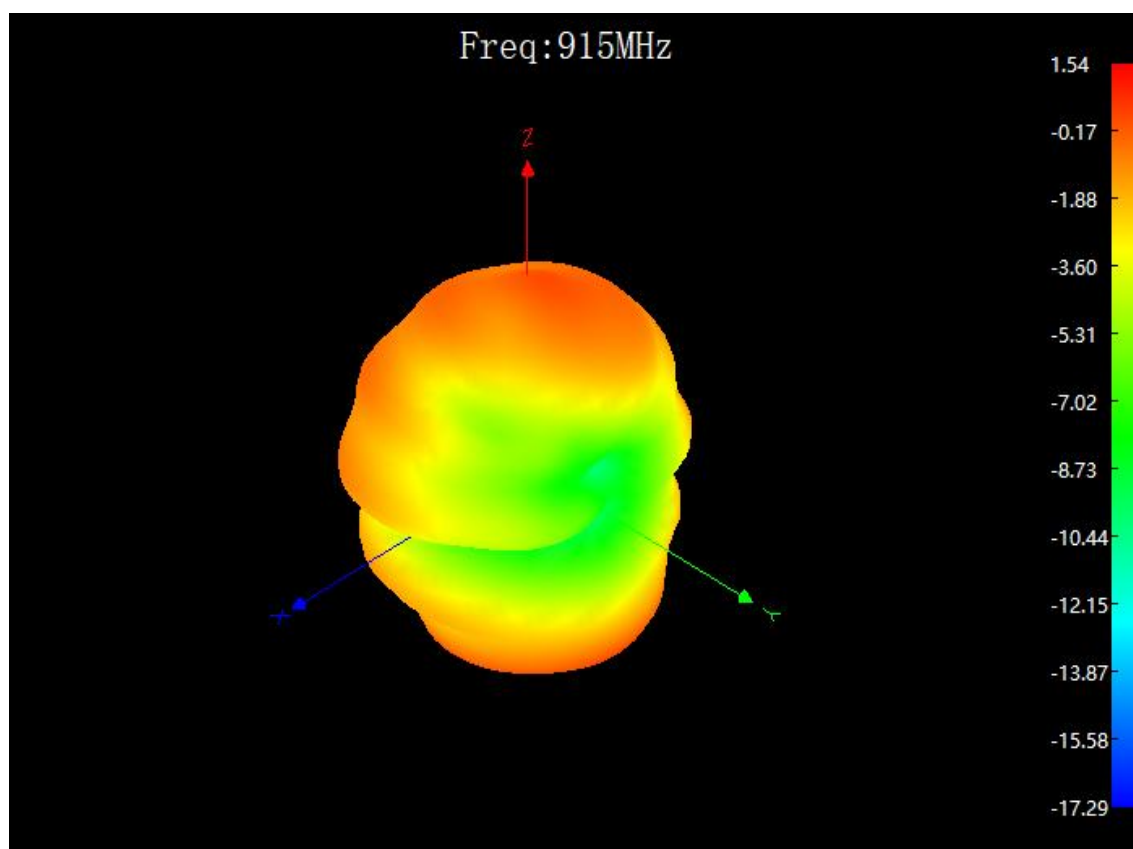
The efficiency, radiation pattern, gain, and other performance metrics are based on the design of the test PCB. The specification and characteristic test data for the AB?S1003 antenna are obtained using a test PCB with the dimensions and orientation shown in the figure below. The following data are derived from measurements performed in an ETS 3D anechoic chamber.



## Antenna Efficiency & Gain Chart

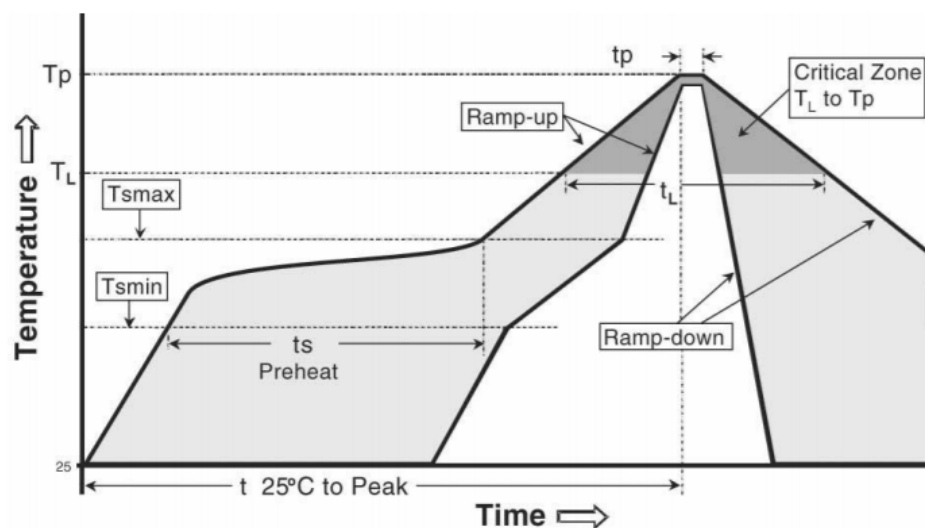


3D Radiation Diagram



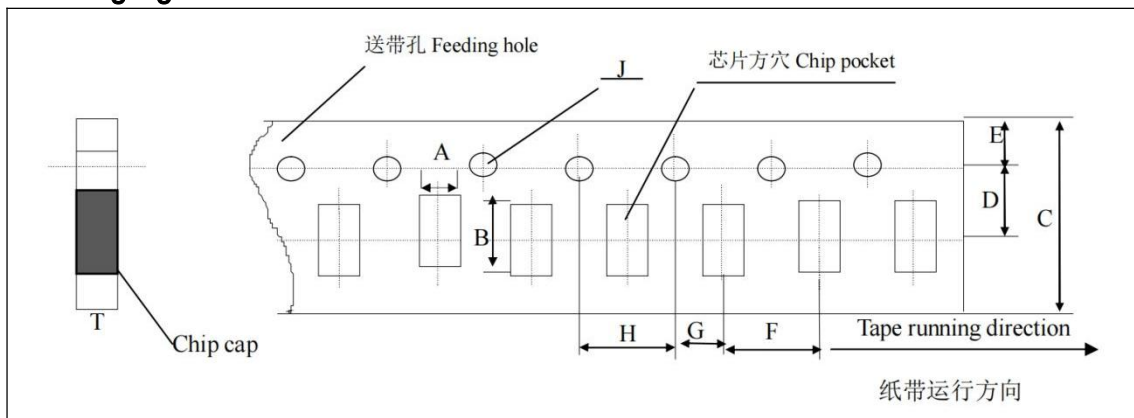
## Soldering Conditions

Reliable and damage-free typical soldering specifications are shown in the following figure:



| Phase                               | Profile features                                                                                                                                  | Pb-Free assembly (SnAgCu)          |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| RAMP-UP                             | Avg. Ramp-up Rate (Tsmmax to Tp)                                                                                                                  | 3 °C / second (max.)               |
| PREHEAT                             | <ul style="list-style-type: none"> <li>- Temperature Min (Tsmmin)</li> <li>- Temperature Max (Tsmmax)</li> <li>- Time (tsmin to tsmax)</li> </ul> | 150 °C<br>200 °C<br>60-180 seconds |
| REFLOW                              | <ul style="list-style-type: none"> <li>- Temperature (TL)</li> <li>- Total Time above TL (tL)</li> </ul>                                          | 217 °C<br>60-150 seconds           |
| PEAK                                | <ul style="list-style-type: none"> <li>- Temperature (Tp)</li> <li>- Time (tp)</li> </ul>                                                         | 260 °C<br>20-40 seconds            |
| RAMP-DOWN                           | Rate                                                                                                                                              | 6 °C/second max                    |
| Time from 25 °C to Peak Temperature |                                                                                                                                                   | 8 minutes max                      |

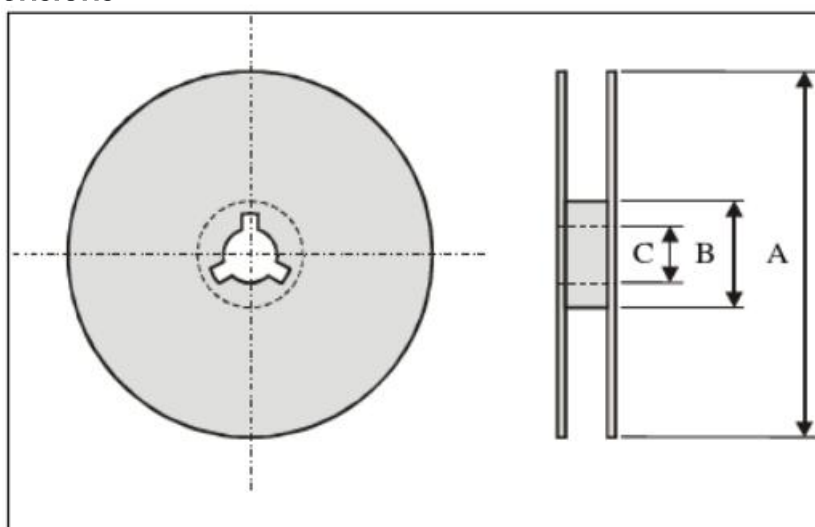
## Packaging



### Carrier Tape Specifications (Unit: mm)

| Index         | A               | B              | C                | D               | J            |
|---------------|-----------------|----------------|------------------|-----------------|--------------|
| Dimension(mm) | $3.3 \pm 0.10$  | $11.0 \pm 0.1$ | $24.00 \pm 0.10$ | $14.0 \pm 0.05$ | $2.00/+0.10$ |
| Index         | E               | F              | G                | H               | T            |
| Dimension(mm) | $1.75 \pm 0.10$ | $8.00 \pm 0.1$ | $4.00 \pm 0.10$  | $8.00 \pm 0.10$ | 2.10Max      |

### Reel Dimensions



| Index         | A   | B   | C            |
|---------------|-----|-----|--------------|
| Dimension(mm) | 330 | 100 | $13 \pm 0.5$ |

Standard Quantity: 3000 PCS/Reel.

**Storage Conditions :**

**Temperature:** -10 °C ~ +40 °C

**Humidity:** 30% – 70% RH

Do not store the product where it may be exposed to corrosive gases such as sulfur, chlorine, or acids, as these may cause electrode oxidation and degrade solderability.

Store the product in a tool cabinet or similar container, protected from moisture and dust.

Store the product in a warehouse environment, avoiding heat, vibration, and direct sunlight.

The product should be stored in sealed packaging.