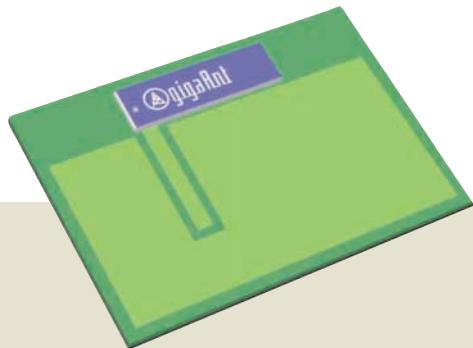


## 2.4 GHz Rufa SMD Antenna

Embedded, Low-Profile antenna  
for automatic assembly



Size: 12.8 x3.9x1.0 mm

This surface-mounted, high-performance low-profile antenna is intended for use with all 2.4 GHz applications where small size and low-profile are key factors.

The antenna requires a ground plane, i.e. your device acts as an active part of the antenna and thus demands careful consideration concerning its placement. For optimal performance, we strongly recommend those customers not very well acquainted with RF technology to use our know-how when it comes to implementing the antenna in your application. We can offer advanced measuring equipment, custom tuning and technical support to obtain a secure and reliable implementation.

The Rufa antenna is suitable for Bluetooth™, Wireless LAN and Home RF products within the 2.4 GHz range. Typical application areas are:

- Mobile phones
- PDAs
- Headsets
- Laptop PCs
- Compact Flash cards
- PC cards

### Description

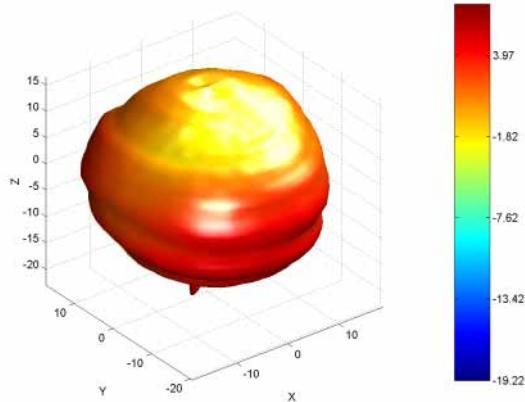
The Rufa SMD antenna is an integrated low-profile antenna, only 12.8 x3.9x1.0 mm in size. It is intended for SMT assembly. Matching network is needed. On request the Rufa antenna can be customized according to your design.

## Antenna Specification

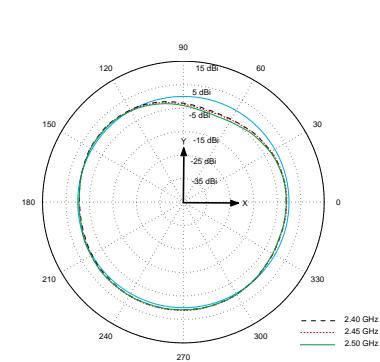
Frequency:	2.4-2.5 GHz
Type:	Ground plane dependent
Efficiency:	65%*
Gain:	4 dBi*
Nominal impedance:	50 Ohm
VSWR:	<2:1*
Mounting:	SMD
Operating temperature:	-40 °C to +85 °C
Relative humidity:	93% at +40 °C
Weight:	0.1 g

\* Typical values

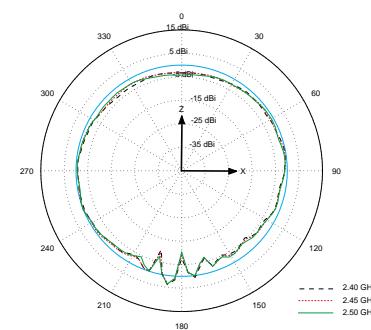
### Typical 3D Radiation pattern



### Horizontal cut, xy-plane

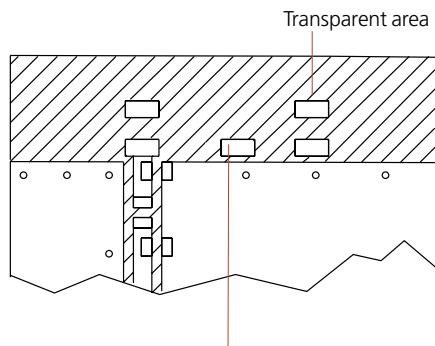


### Vertical cut, xz-plane



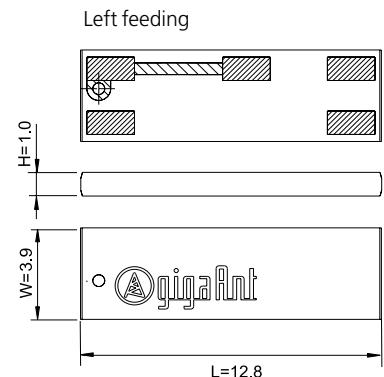
## Dimensions

Mounting interface (Left feeding)



Detailed foot print see application note

Configuration



## Product name

Rufa 2.4GHz Left Feeding  
Rufa 2.4GHz Right Feeding

## Article No.

3030A5839-01  
3030A5887-01

## Packaging

Tape on reel  
Tape on reel

Prepared by Marie Fransson	Approved by Anders Sunesson	Date (last revision) 2005-01-29	Doc. No. AA050004	Rev A
Distribution EA, The customer				

## Rufa antenna for Connectblue

### 1 Background

Connectblue has sent us 2 test pcbs for making a good matching of the Rufa antenna. Both return loss and efficiency are measured.

### 2 Test object

Two pcbs were sent to use. For this matching we have used the pcb with the most components. Figure 1 and 2 show the pcb. A cable is soldered to the point before the matching network to be used for matching and measurements. The "extra" connector on the backside are used for all measurements.

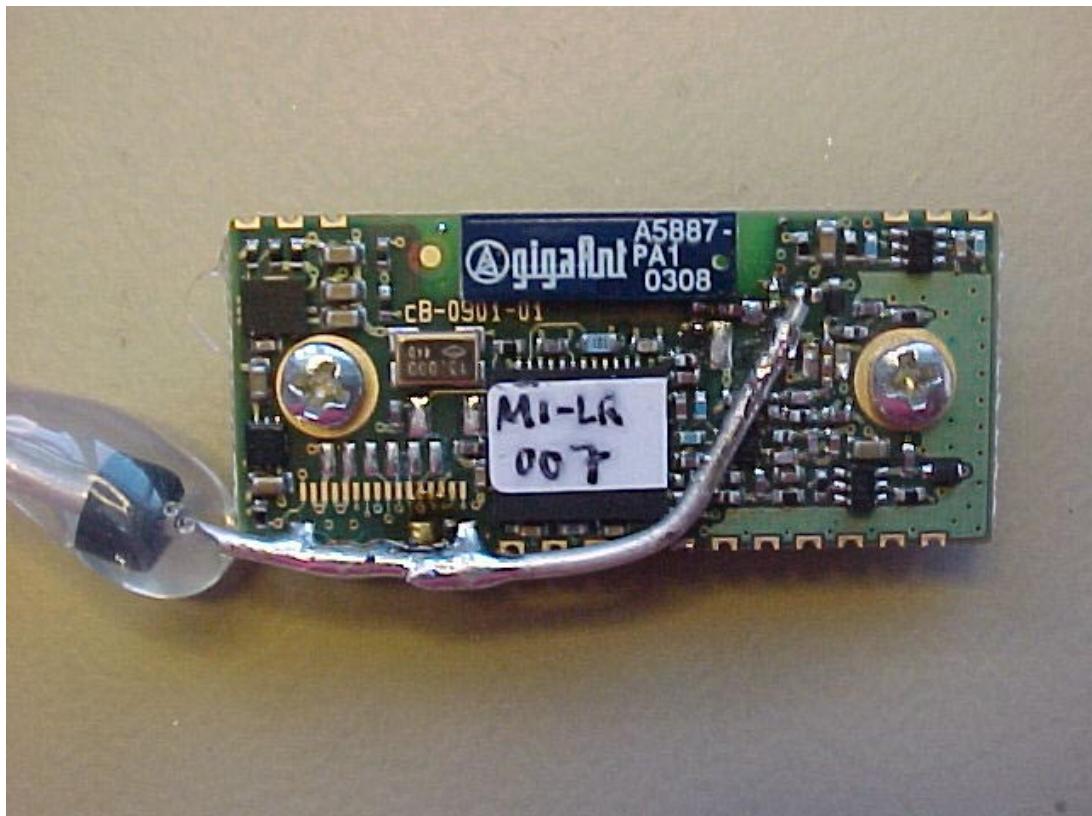


Figure 1, front side of pcb

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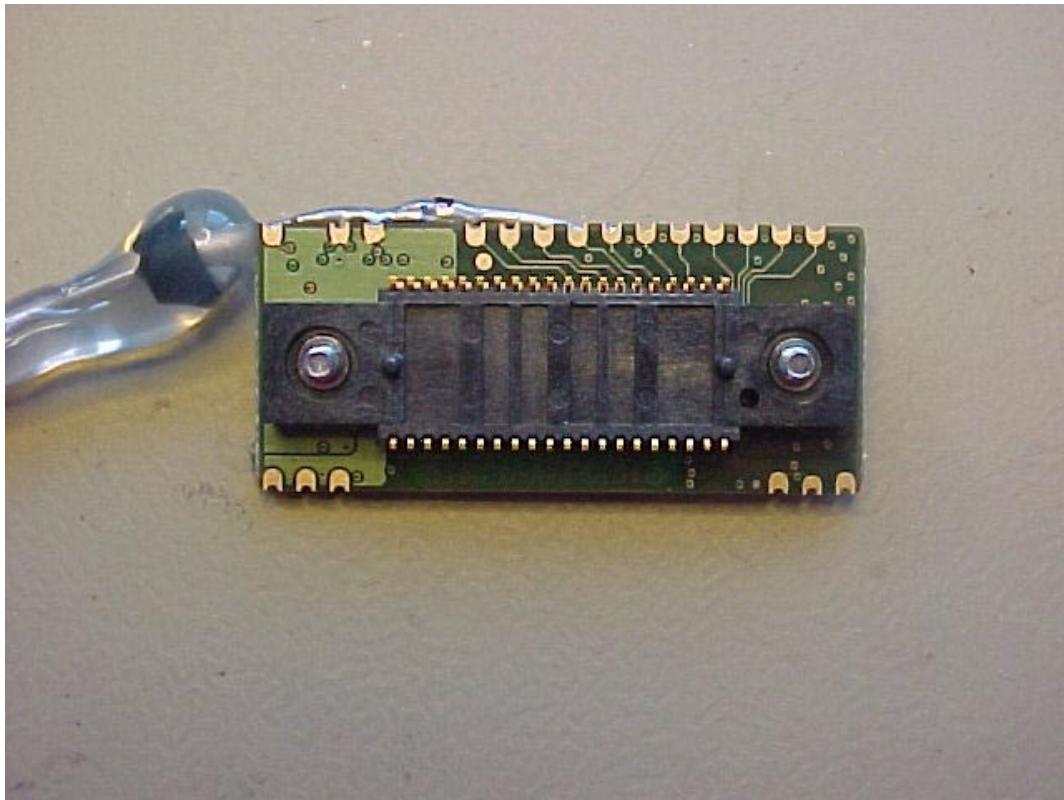


Figure 2, backside of pcb

## 2.1 Matching network used

The matching network proposed for this product is seen in figure 3.

This is a 1.2 pF capacitor in series and a 2.2 nH inductor in shunt on the feed side.

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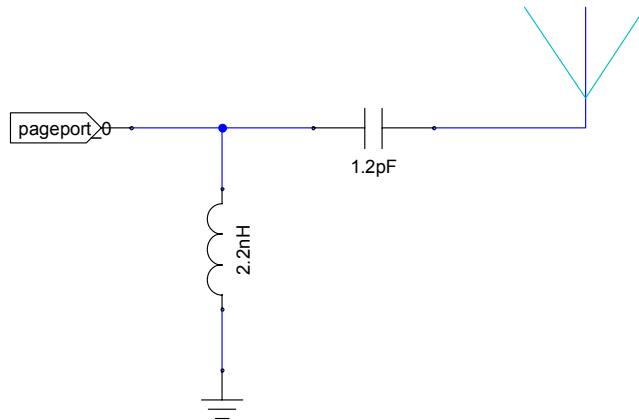


Figure 3, optimal matching network for the Rufa antenna

## 3 Return loss measurement

Return loss is measured with a calibrated network analyser from Advantest.

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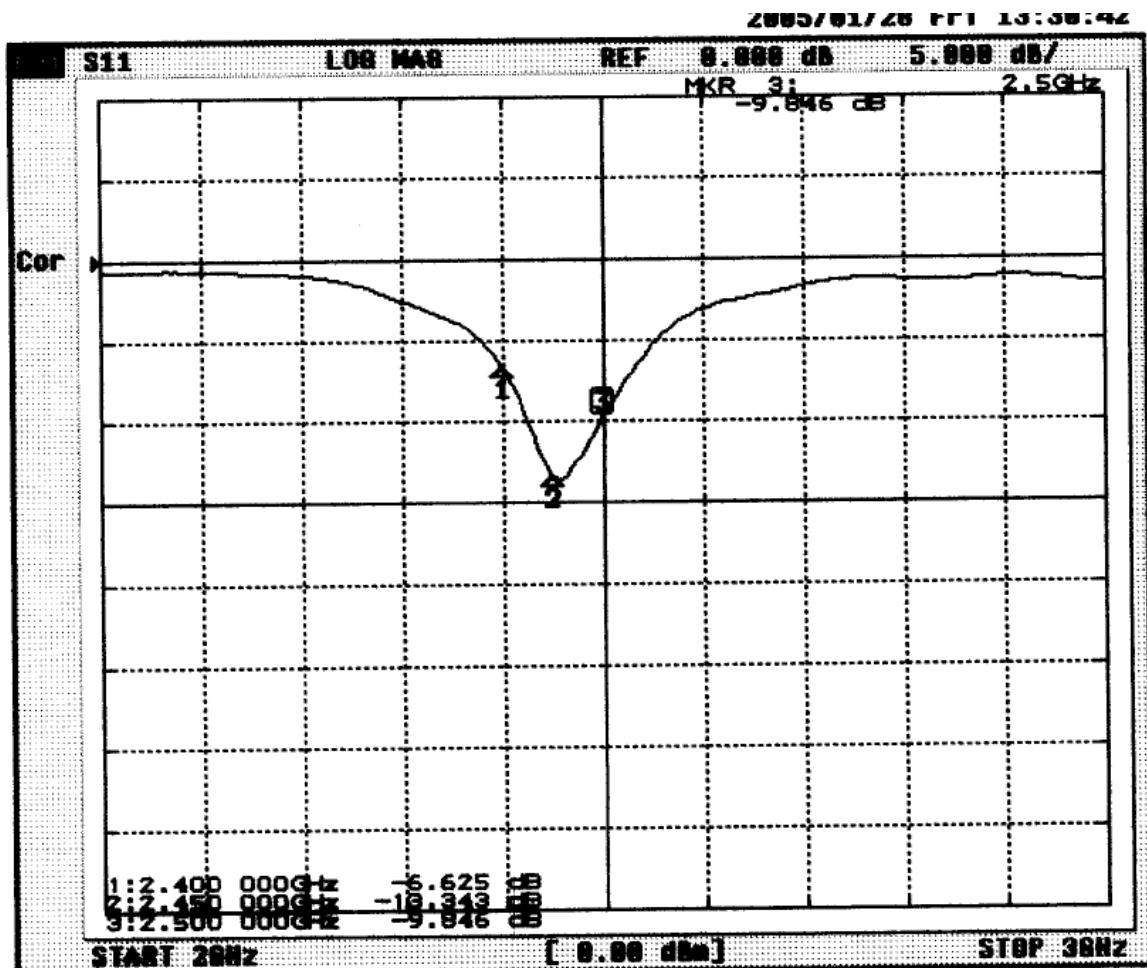


Figure 4, return loss for PCB with antenna and matching network.

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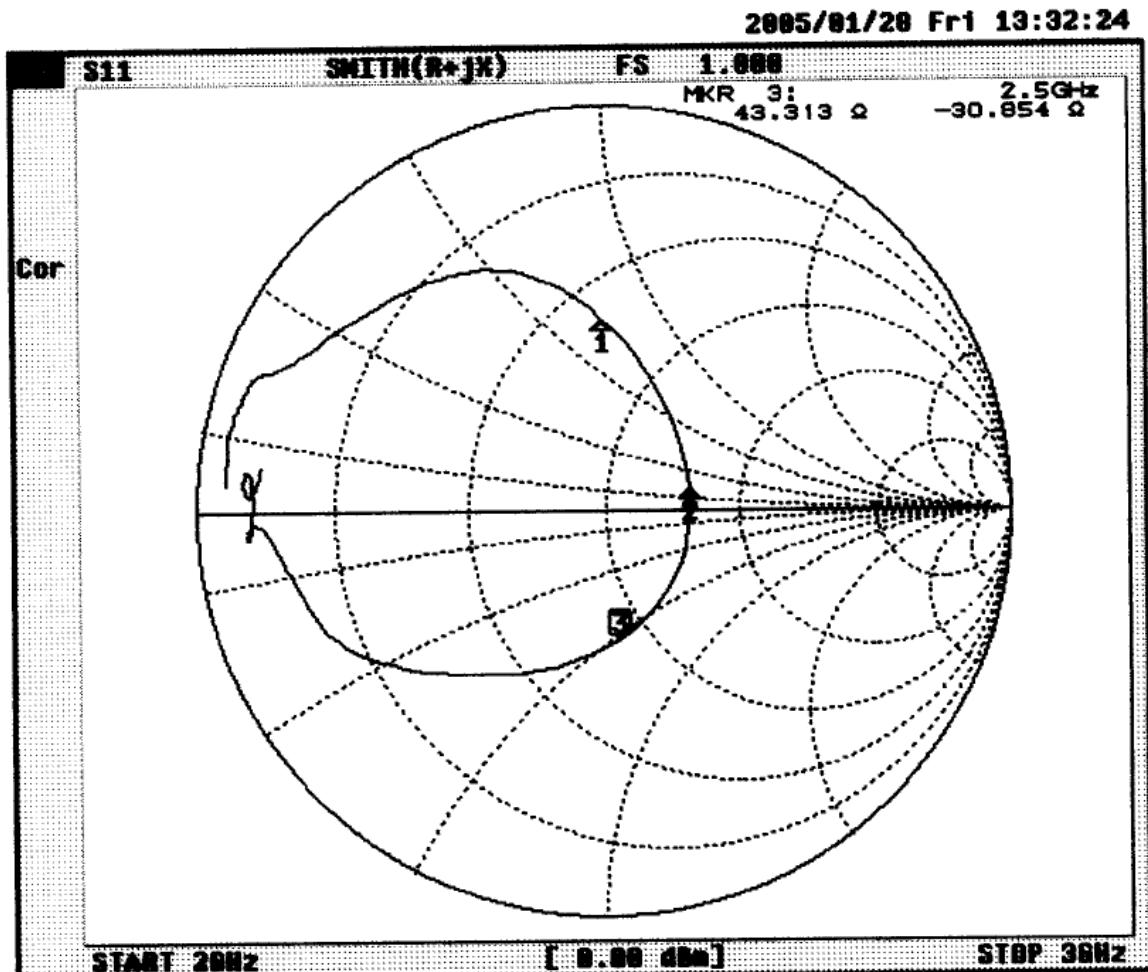


Figure 5, Smith chart for PCB and antenna with matching network.

## 4 Efficiency measurement

### 4.1 Test set-up and antenna orientation

The efficiency are measured in the Perlos 3D near field chamber from Orbit/FR. Please find a schematic view of the chamber in figure 6. The pcb is mounted in the middle of the chamber and then the pcb and antenna are rotating in the phi direction and the two measurement probes are sliding in the theta axis. The efficiency of the test PC board is measured.

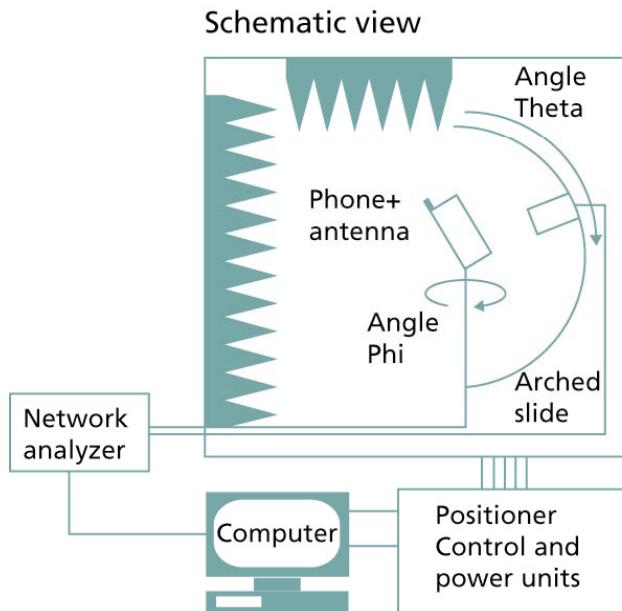


Figure 6, Schematic view of the Perlos 3D chamber.

## 4.2 Measurement results

Please find the results in table 1.

Frequency (GHz)	Efficiency (%)	Return loss (dB)
2.40	20	-6
2.45	28	-13
2.50	25	-10

Table 1, Measurement results

## 5 Conclusions

A matching network is done for the Connectblue pcb together with the gigaAnt Rufa antenna. A 1.2 pF in series and a 2.2 nH in shunt on the feed side is used. The efficiency for this pcb+antenna is between 20-30 %.