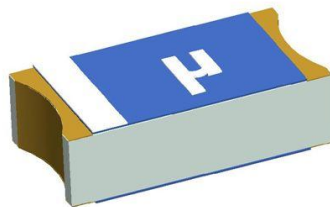




# Fractus Micro Reach Xtend™

Bluetooth® , Zigbee® , 802.11b/g WLAN

*Chip Antenna*



**Antenna Part Number:  
FR05-S1-N-0-110**





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Fractus is an **ISO 9001:2008** certified company  
All our antennas are lead-free and **RoHS** compliant

## NOTES

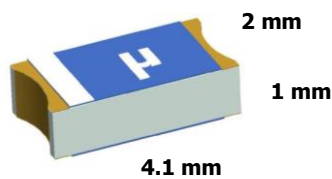
This product is protected by at least the following patents PAT. US 7,148,850, US 7,202,822 and other domestic and international patents pending. Any update on new patents linked to this product will appear in <http://www.fractus.com/index.php/fractus/patents>

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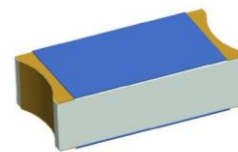


## ANTENNA DESCRIPTION

Fractus® Micro Reach Xtend™ Chip Antenna is a very small size and low cost antenna that combines reduced clearance area required within the customer PCB with its high performance and integration flexibility. This makes it ideal for small consumer electronics devices such as small wireless headsets and highly integrated multifunction mobile handsets.



**TOP**



**BOTTOM**

### **APPLICATIONS**

- *Wireless Headsets*
- *Cellular handsets*
- *Bluetooth USB and serial Dongles*
- *Secure Digital (SD) cards*

### **BENEFITS**

- *Small form factor*
- *Reduced clearance area within PCB*
- *Low cost*
- *Easy to Use*

## QUICK REFERENCE GUIDE

Technical Features	
Frequency range	2.4 GHz - 2.5 GHz
Average Efficiency	54.2 %
Peak Gain	0.2 dB
Radiation Pattern	Omnidirectional
VSWR	< 2:1
Polarization	Linear
Weight (aprox.)	0.01 g
Temperature	-40 to + 85°C
Impedance	50Ω
Dimensions (L x W x H)	4.1 mm x 2 mm x 1 mm

**Table 1** -Technical Features. Measures from the evaluation board (40 mm x 20 mm x 1 mm PCB)

Please contact [info@fractus.com](mailto:info@fractus.com) if you require additional information on antenna integration or optimisation on your PCB.

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## ELECTRICAL PERFORMANCE

### FRACTUS EVALUATION BOARD

The Fractus configuration used in testing the Micro Reach Xtend chip antenna is displayed in Figure 1.

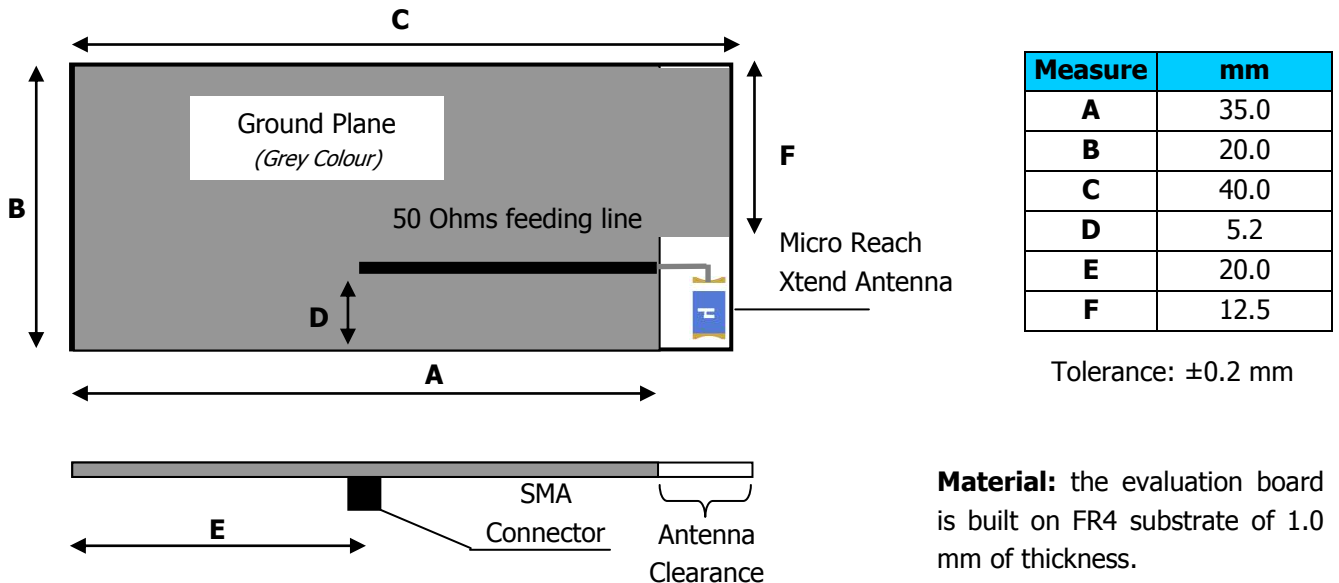
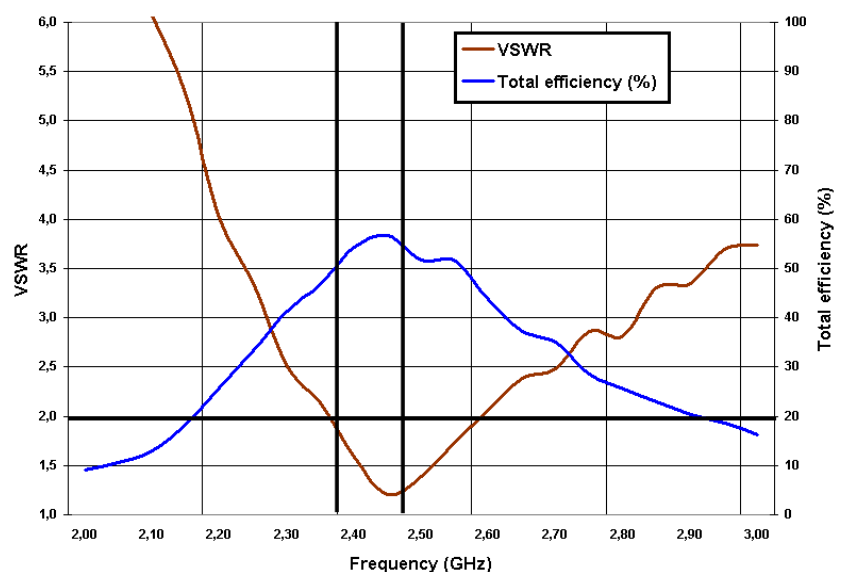
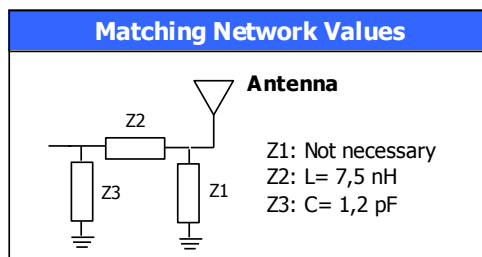


Figure 1 – Micro Reach Xtend Evaluation Board

### VSWR

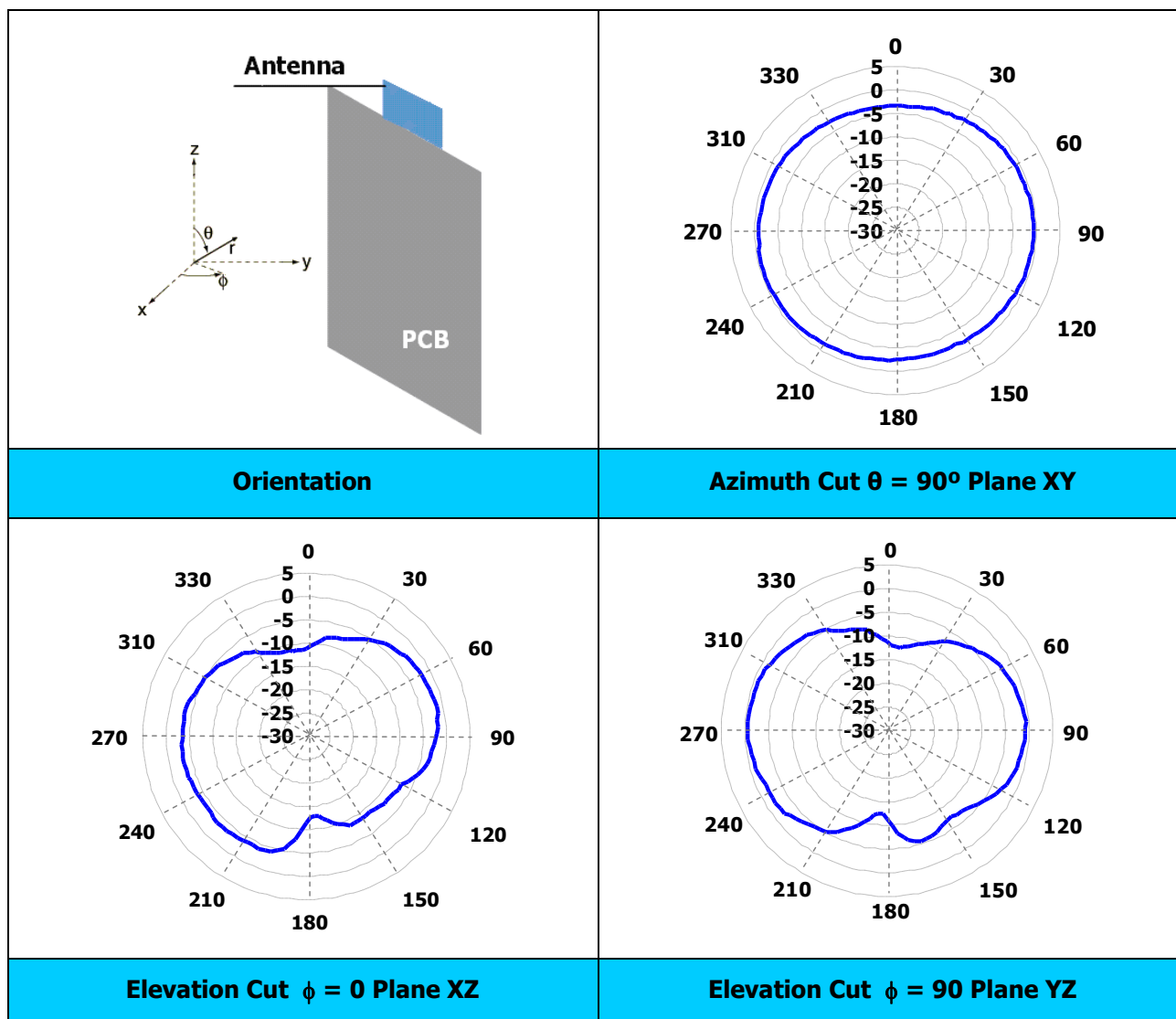
VSWR (Voltage Standing Wave Ratio) and Efficiency versus Frequency (GHz)



**Note:** Optimal matching network values may vary depending on the antenna environment. Please, contact Fractus if you require support for the integration of the antenna in your specific application.



### Radiation Pattern, Gain and Efficiency



<b>Gain</b>	<b>Peak Gain</b>	0.2 dB
	<b>Average Gain across the band</b>	0 dB
	<b>Gain Range across the band (min, max)</b>	-0.17 dB , 0.2 dB
<b>Efficiency</b>	<b>Peak Efficiency</b>	56.7 %
	<b>Average Efficiency across the band</b>	54.2 %
	<b>Efficiency Range across the band</b>	51.7 % - 56.7 %

**Table 2** – Antenna Gain and Efficiency within the 2.4-2.5 GHz band. Measures made in the evaluation board and in the Satimo STARGATE 32.



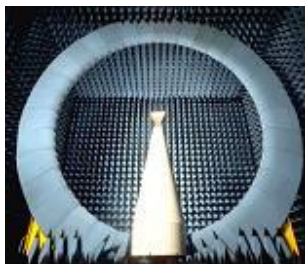
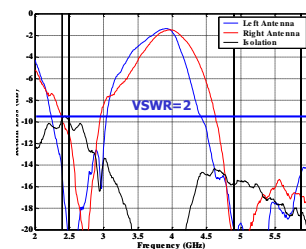
### CAPABILITIES AND MEASUREMENT SYSTEMS

Fractus specialises in designing and manufacturing optimised antennas for wireless applications and providing our clients with RF expertise. We offer turn-key antenna products and antenna integration support to minimise your time requirement and maximize your return on investment during your product development efforts. We also provide our clients with the opportunity to leverage our in-house testing and measurement facilities to obtain accurate results quickly and efficiently.



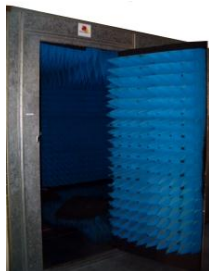
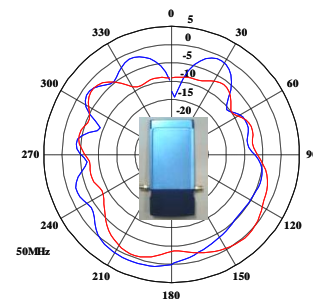
**Agilent E5071B**

VSWR  
&  
S Parameters



**SATIMO's STARGATE 32**

Radiation  
Pattern  
&  
Efficiency

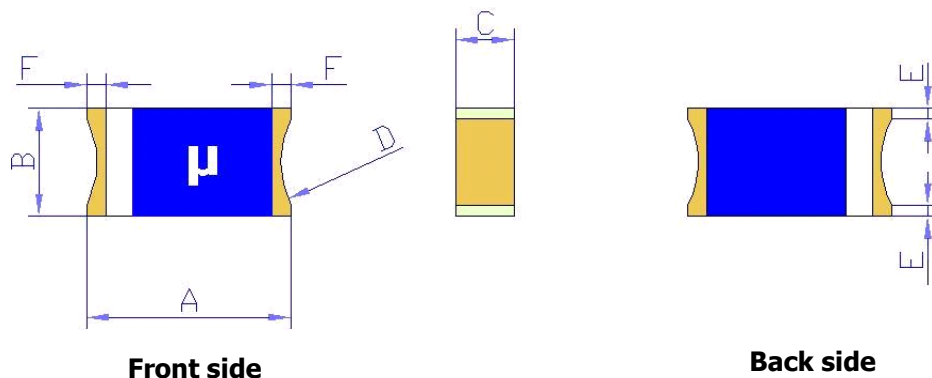


**Anechoic and semi-anechoic chambers and full equipped in-house lab**



# MECHANICAL CHARACTERISTICS

## DIMENSIONS, TOLERANCES & MATERIALS



**Figure 2** – Antenna Dimensions and Tolerances

Measure	mm	Measure	mm
<b>A</b>	$4.1 \pm 0.2$	<b>D</b>	$1.7 \pm 0.1$
<b>B</b>	$2 \pm 0.2$	<b>E</b>	$0.2 \pm 0.1$
<b>C</b>	$1 \pm 0.2$	<b>F</b>	$0.25 \pm 0.1$

The white rectangle located on the front side of the antenna provides you with a visual cue to mount the antenna. It identifies the feed point of the antenna.

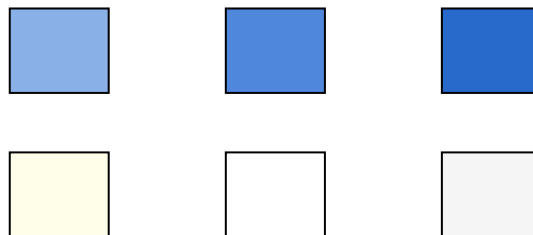
Fractus Micro Reach Xtend chip antenna is compliant with the European directive **2002/95/EC** on the restriction of the use of hazardous substances (**RoHS**). Should you require a green certificate (RoHS report), please contact your sales representative at [info@fractus.com](mailto:info@fractus.com).



### SPECIFICATIONS FOR INK

<b>Blue (pantone 312)</b>	<ul style="list-style-type: none"><li>• 50% Blue CARAPACE EMP 110-3245</li><li>• 50% White ink CARAPACE</li></ul>
<b>White</b>	<ul style="list-style-type: none"><li>• White ink CARAPACE</li></ul>

Next figure shows the correct colours of the antenna:



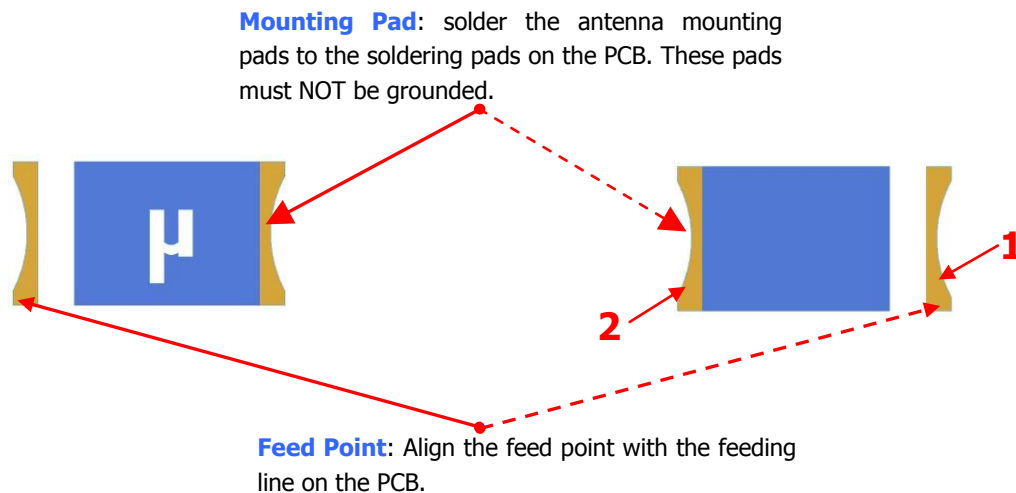
**Acceptable colour range**





### ASSEMBLY PROCESS

Figure 3 shows the back and front view of the Micro Reach Xtend chip antenna, which indicates the location of the feeding point and the mounting pad:

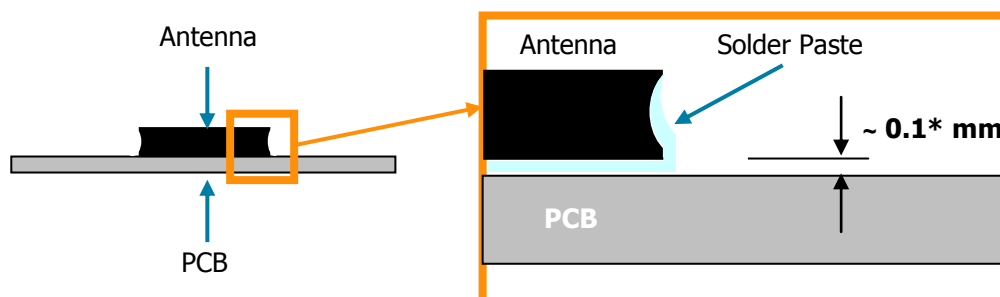


**Figure 3** –Views of the Micro Reach Xtend Chip Antenna.

As a surface mount device (SMD), this antenna is compatible with industry standard soldering processes. The basic assembly procedure for this antenna is as follows:

1. Apply a solder paste on the pads of the PCB. Place the antenna on the board.
2. Perform a reflow process according to the temperature profile detailed in table 3, figure 5 of page 9.
3. After soldering the antenna to the circuit board, perform a cleaning process to remove any residual flux. Fractus recommends conducting a visual inspection after the cleaning process to verify that all reflux has been removed.

The drawing below shows the soldering details obtained after a correct assembly process:



**Figure 4** - Soldering Details

**NOTE(\*):** Solder paste thickness after the assembly process will depend on the thickness of the soldering stencil mask. A stencil thickness equal or larger than **127 microns (5 mils)** is required.

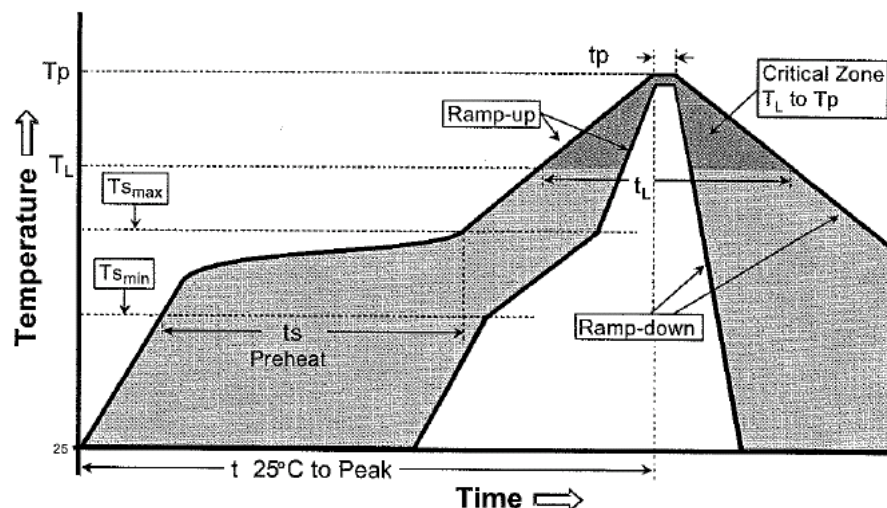


Fractus Micro Reach Xtend chip antenna can be assembled following either Sn-Pb or Pb-free assembly processes. According to the Standard **IPC/JEDEC J-STD-020C**, the temperature profile suggested is as follows:

Phase	Profile features	Sn-Pb Assembly	Pb-Free Assembly (SnAgCu)
<b>RAMP-UP</b>	Avg. Ramp-up Rate ( $T_{smax}$ to $T_p$ )	3 °C / second (max.)	3 °C / second (max.)
<b>PREHEAT</b>	<ul style="list-style-type: none"><li>- Temperature Min (<math>T_{smin}</math>)</li><li>- Temperature Max (<math>T_{smax}</math>)</li><li>- Time (<math>t_{smin}</math> to <math>t_{smax}</math>)</li></ul>	100 °C 150 °C 60-120 seconds	150°C 200°C 60-180 seconds
<b>REFLOW</b>	<ul style="list-style-type: none"><li>- Temperature (<math>T_L</math>)</li><li>- Total Time above <math>T_L</math> (<math>t_L</math>)</li></ul>	183 °C 60-150 seconds	217 °C 60-150 seconds
<b>PEAK</b>	<ul style="list-style-type: none"><li>- Temperature (<math>T_p</math>)</li><li>- Time (<math>t_p</math>)</li></ul>	235 °C 10-30 seconds	260 °C 20-40 second
<b>RAMP-DOWN</b>	Rate	6 °C / second max.	6 °C/second max.
<b>Time from 25 °C to Peak Temperature</b>		6 minutes max.	8 minutes max.

**Table 3** – Recommended soldering temperatures

Next graphic shows temperature profile (grey zone) for the antenna assembly process in reflow ovens.

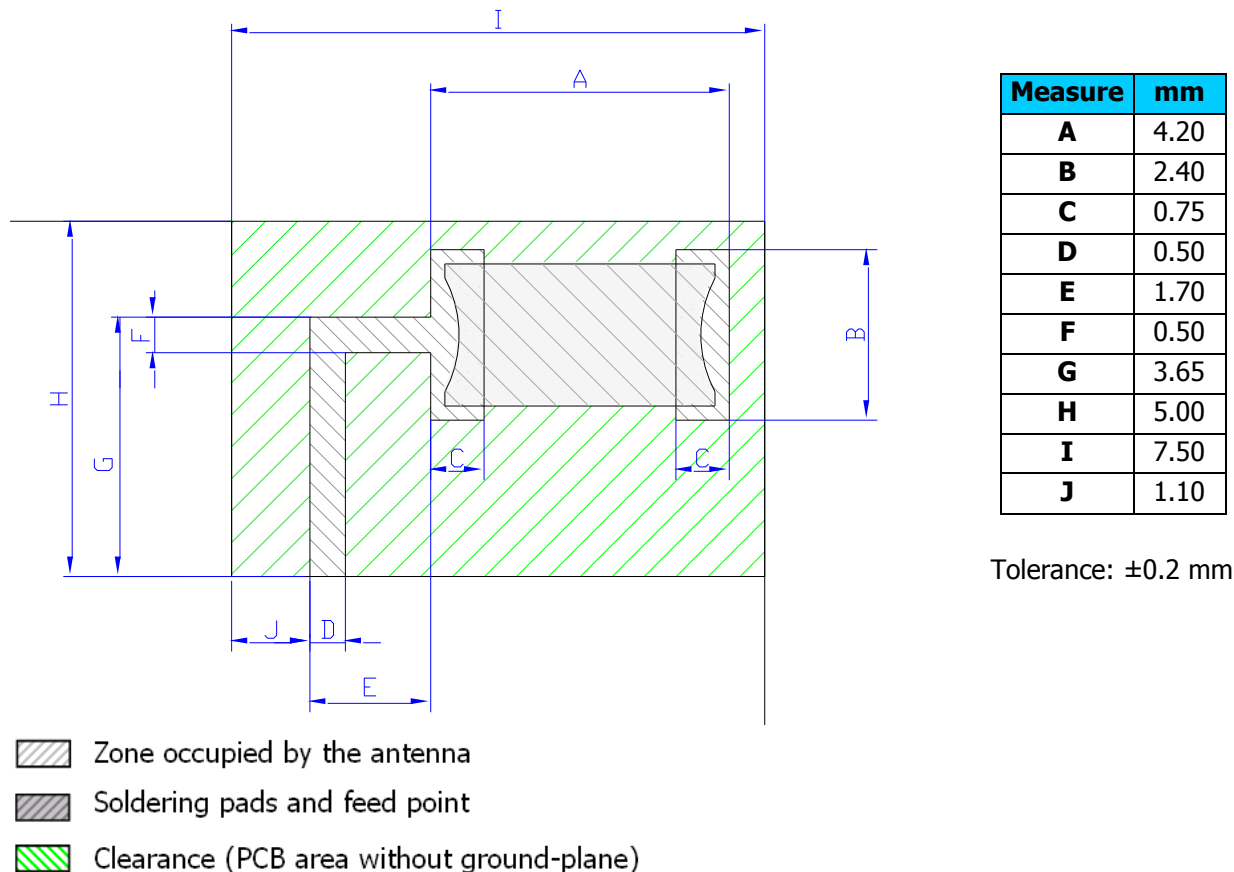


**Figure 5** – Temperature profile



### ANTENNA FOOTPRINT

This antenna footprint applies to the reference evaluation board described in page 4 of this User Manual. Feeding line dimensions over the clearance zone described in figure 6 applies for a 1 mm thickness FR4 PCB.



**Figure 6** – Antenna Footprint Details

Other PCB form factors and configurations may require a different feeding configuration, feeding line dimensions and clearance areas. If you require support for the integration of the antenna in your industrial design, we would be pleased to assist you with this design process.

Please, contact your sales representative at Fractus to get additional information on recommended configurations for different devices:

FRACTUS, S.A.

[info@fractus.com](mailto:info@fractus.com)

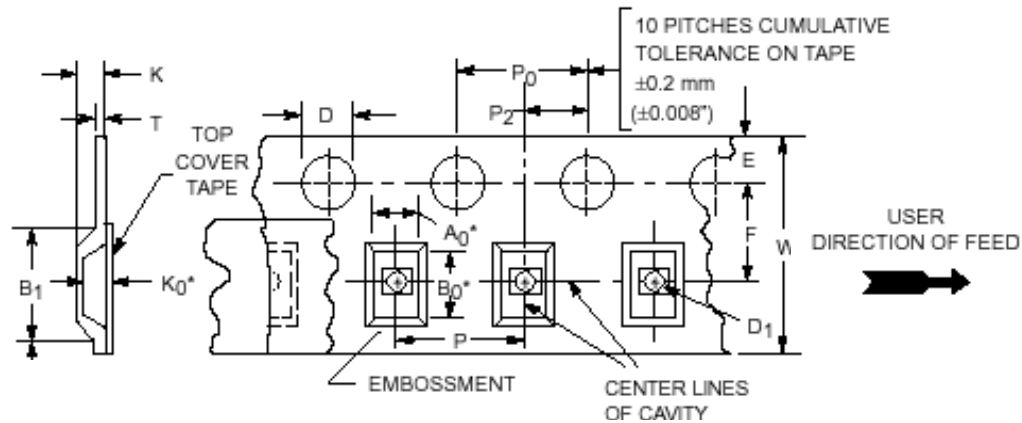
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### PACKAGING

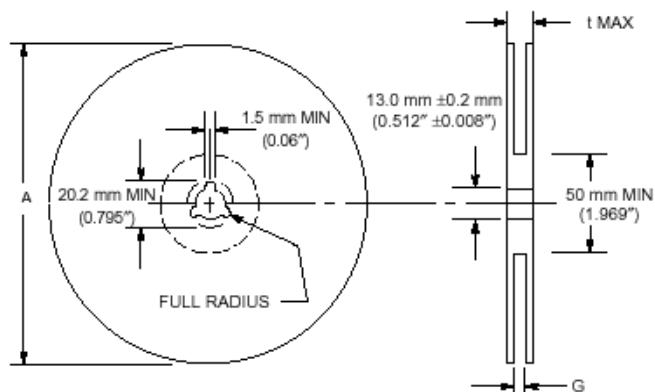
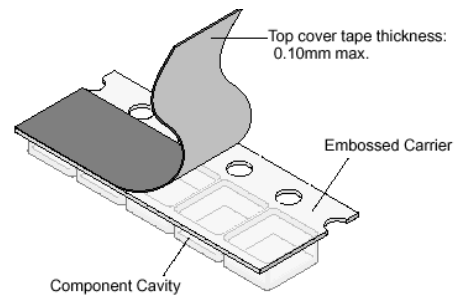
The Micro Reach Xtend chip antenna is available in tape and reel packaging.



**Figure 7** –Tape Dimensions

Measure	mm	Measure	mm
<b>TAPE WIDTH</b>	12	<b>Wmax</b>	12.5
<b>A0</b>	2.5	<b>E</b>	1.5
<b>B0</b>	4.9	<b>F</b>	5.5
<b>K0</b>	1.3	<b>K</b>	1.6 max
<b>B1</b>	5.0 max	<b>P</b>	4.5
<b>D</b>	1.55	<b>P0</b>	4.5
<b>D1</b>	1.6 min	<b>P2</b>	1.5

Tolerance in all above measures:  $\pm 0.2$  mm



Measure	mm
<b>A max</b>	180
<b>G</b>	13
<b>t max</b>	15.4

Tolerance:  $\pm 0.2$  mm

**Reel Capacity:** 2500 antennas.

**Figure 8** – Reel Dimensions and Capacity