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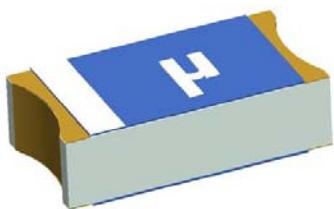
Optimised Antennas
for Wireless Devices

User Manual

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 9001:2000 certified company
All our antennas are lead-free and RoHS compliant

NOTES

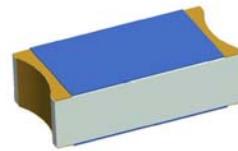
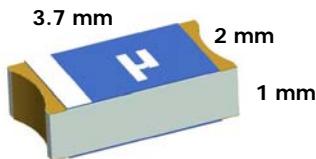
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ANTENNA DESCRIPTION

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.



Front

Back

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	2400-2500 MHz
Radiation Efficiency	> 45%
Peak Gain	- 0.5 dBi
VSWR	< 2:1
Polarization	Linear
Weight	0.1 g
Temperature	-40 to + 85°C
Impedance	50Ω
Dimensions	3.7x2x1 mm

Table 1 - Technical Features

Note: results measured in a reference evaluation board of 40x20 mm, and with a 2 element matching network, described in the following section.

Please contact your sales representative at wireless@fractus.com if you require additional information on antenna integration or optimisation on your PCB.

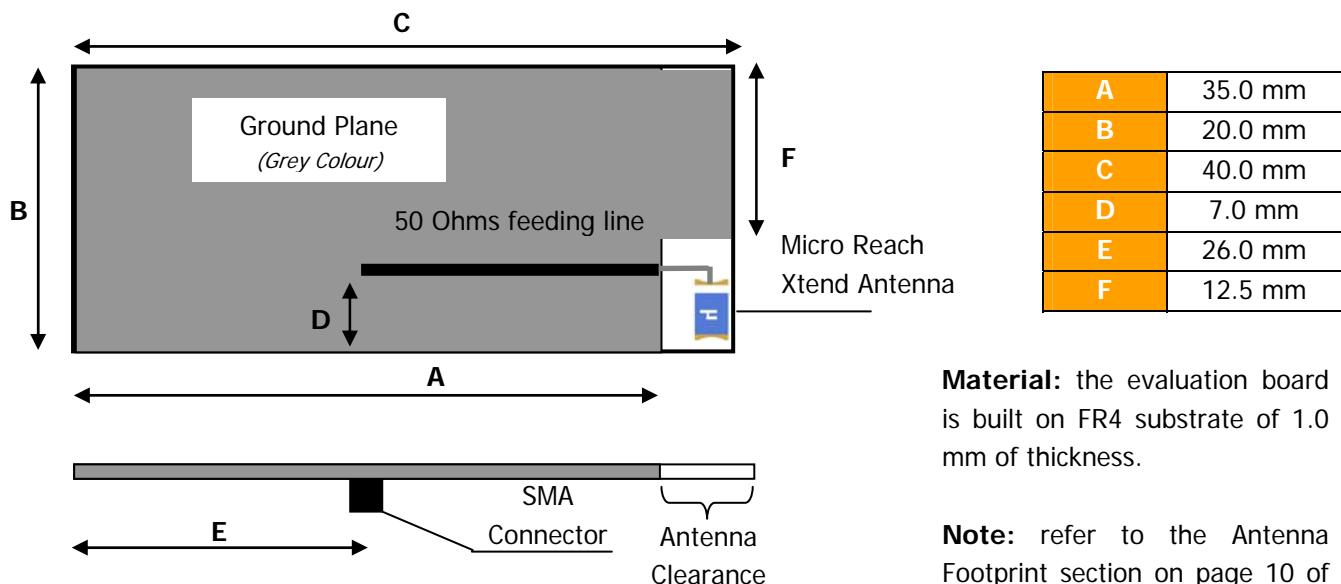
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ELECTRICAL PERFORMANCE

FRACTUS EVALUATION BOARD

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



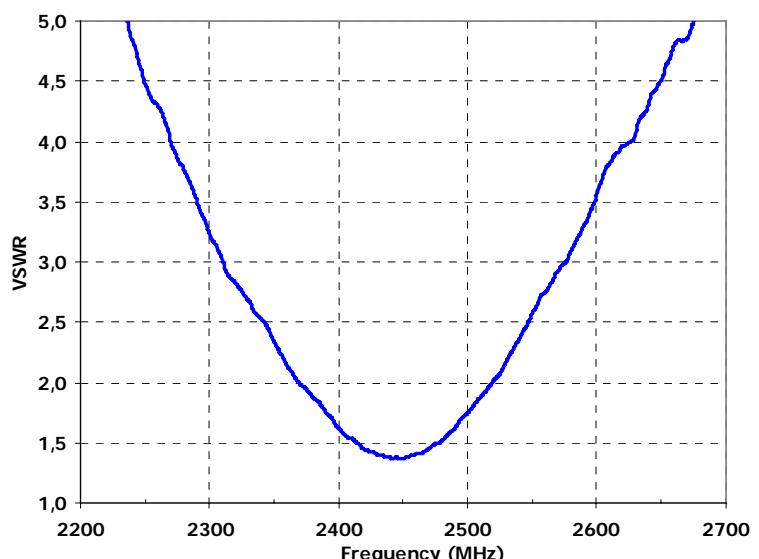
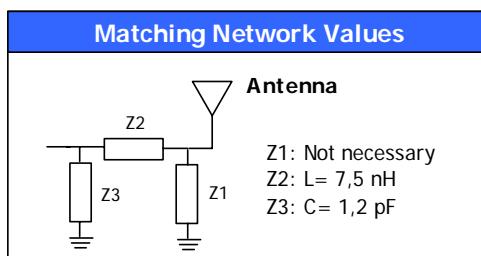
Material: the evaluation board is built on FR4 substrate of 1.0 mm of thickness.

Note: refer to the Antenna Footprint section on page 10 of this User Manual for additional information about the clearance area and antenna footprint.

VSWR

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

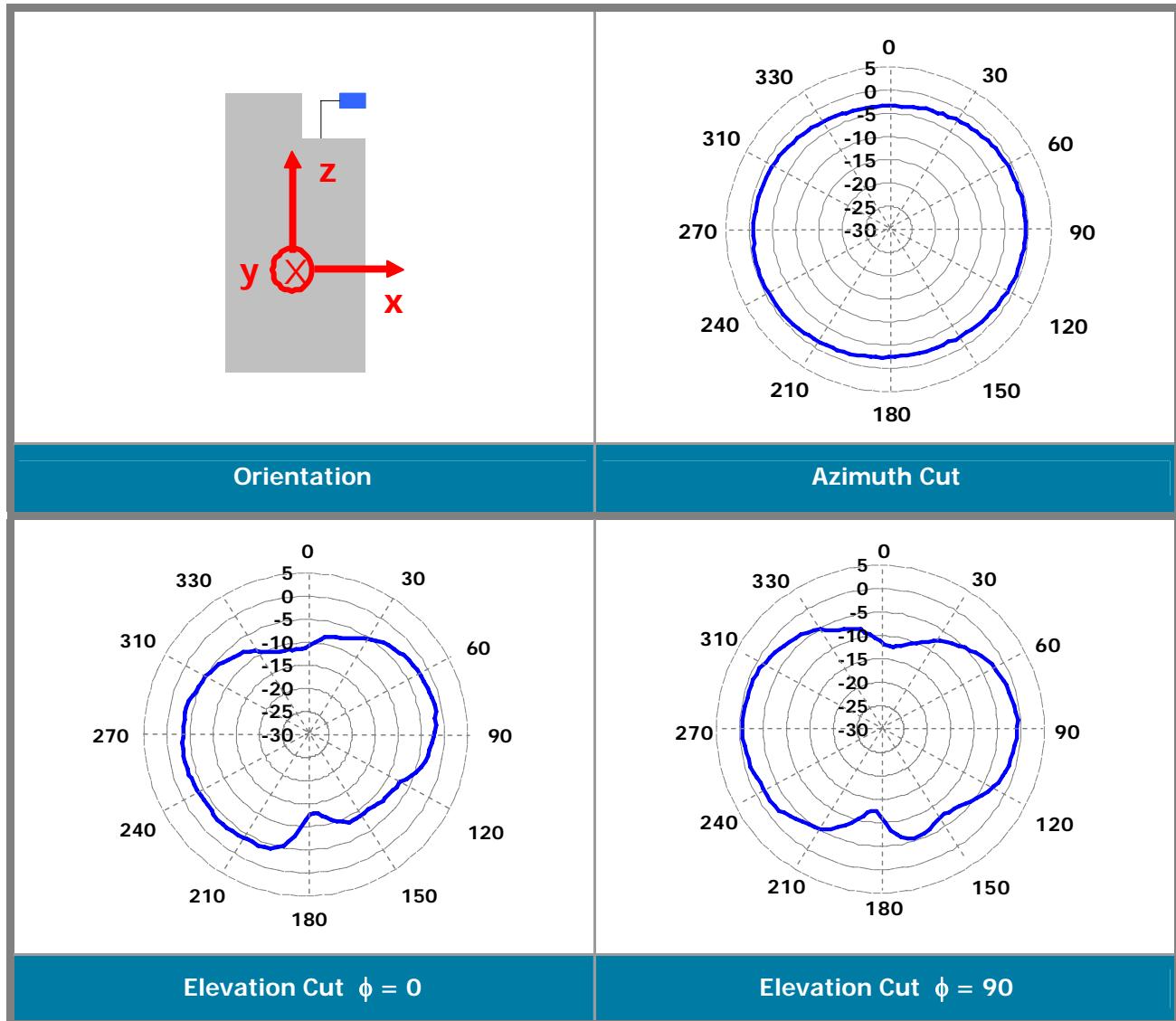
- <2:1 within the ISM-2.4 GHz band
 - 2.4-2.483 in US and Europe
 - 2.471-2.497 in Japan



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



Gain	Peak Gain	- 0.5 dBi
	Average Gain	- 4.5 dBi
Efficiency	Peak Efficiency	48 %
	Average Efficiency	45 %

Table 2 – Antenna Gain and Efficiency within the 2.4-2.5 GHz band

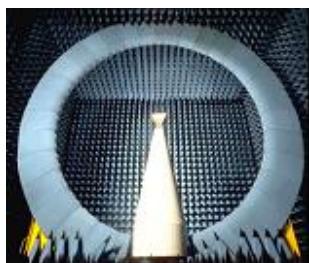
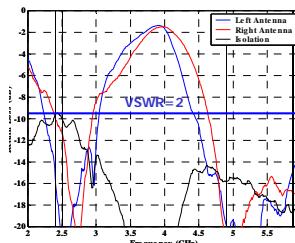


CAPABILITIES AND MEASUREMENT SYSTEMS

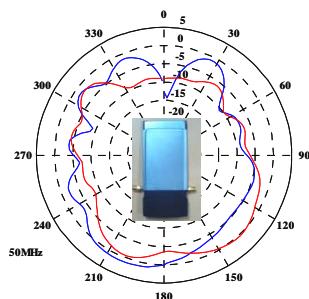
Fractus specialises in designing and manufacturing optimised antennas for wireless applications and providing our clients with RF expertise. We offer turn-key antenna products and antenna integration support to minimise your time requirement and maximize your return on investment during your product 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.



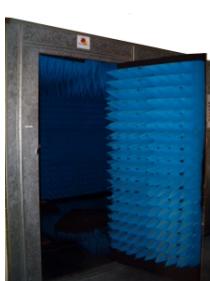
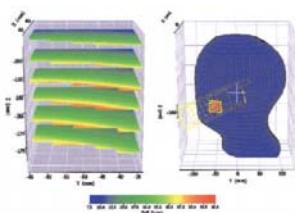
VSWR
&
S Parameters



Radiation
Pattern
&
Efficiency



SAR Levels



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



MECHANICAL CHARACTERISTICS

DIMENSIONS, TOLERANCES & MATERIALS

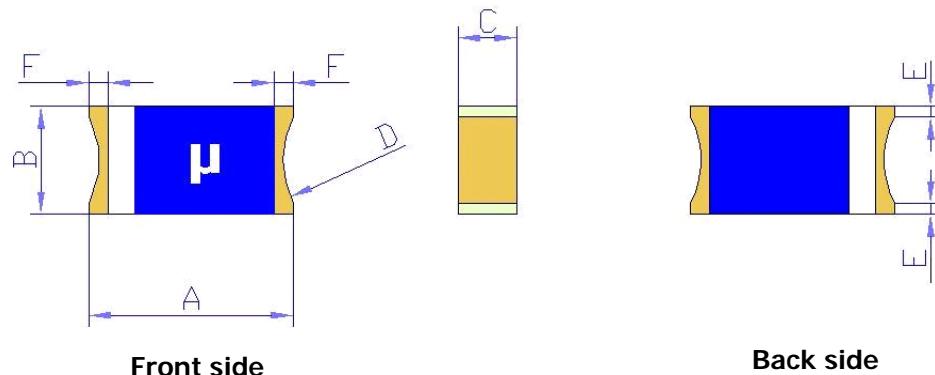


Figure 2 – Antenna Dimensions and Tolerances

A	3.70 ± 0.20	D	1.70 ± 0.10
B	2.00 ± 0.20	E	0.20 ± 0.10
C	1.00 ± 0.20	F	0.25 ± 0.10

All dimensions are in millimetres (mm)

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 wireless@fractus.com.



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:

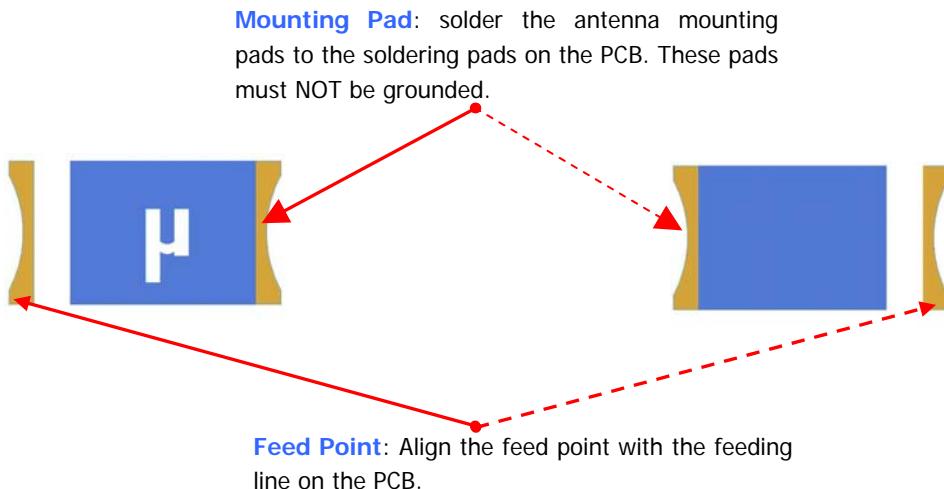


Figure 3 – Views of the Micro Reach Xtend Chip Antenna.

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:

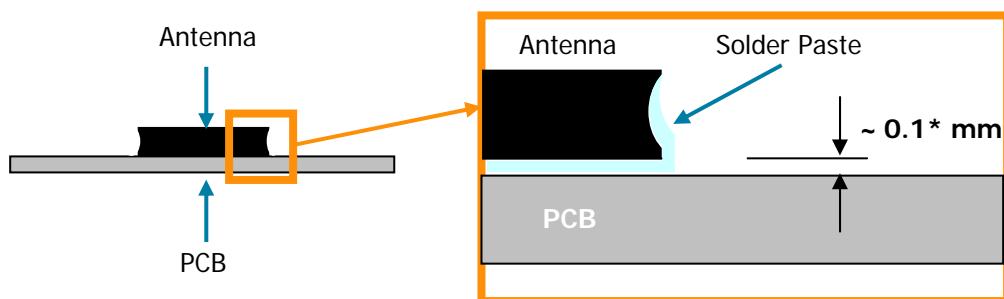


Figure 4 - Soldering Details

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)
RAMP-UP	Avg. Ramp-up Rate ($T_{S\max}$ to T_p)	3 °C / second (max.)	3 °C / second (max.)
PREHEAT	<ul style="list-style-type: none"> - Temperature Min ($T_{S\min}$) - Temperature Max ($T_{S\max}$) - Time ($t_{S\min}$ to $t_{S\max}$) 	100 °C 150 °C 60-120 seconds	150°C 200°C 60-180 seconds
REFLOW	<ul style="list-style-type: none"> - Temperature (T_L) - Total Time above T_L (t_L) 	183 °C 60-150 seconds	217 °C 60-150 seconds
PEAK	<ul style="list-style-type: none"> - Temperature (T_p) - Time (t_p) 	235 °C 10-30 seconds	260 °C 20-40 second
RAMP-DOWN	Rate	6 °C / second max.	6 °C/second max.
Time from 25 °C to Peak Temperature		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.

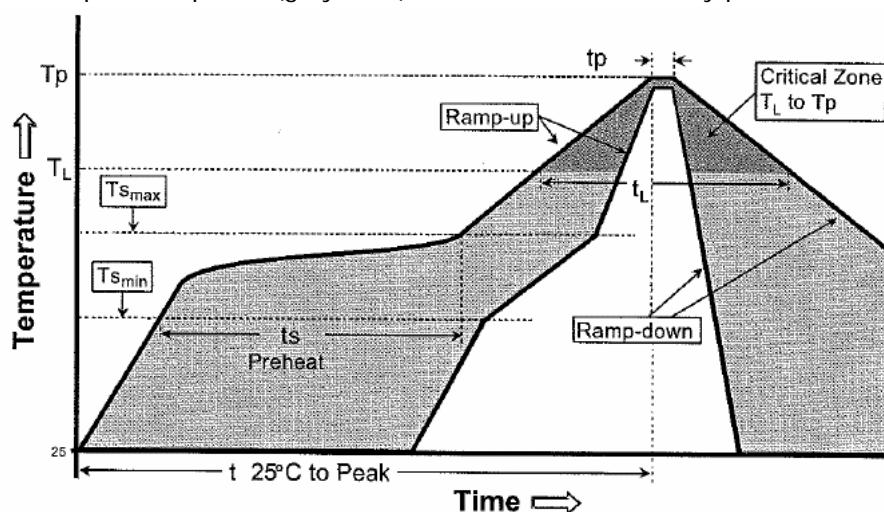


Figure 5 – Temperature profile

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.

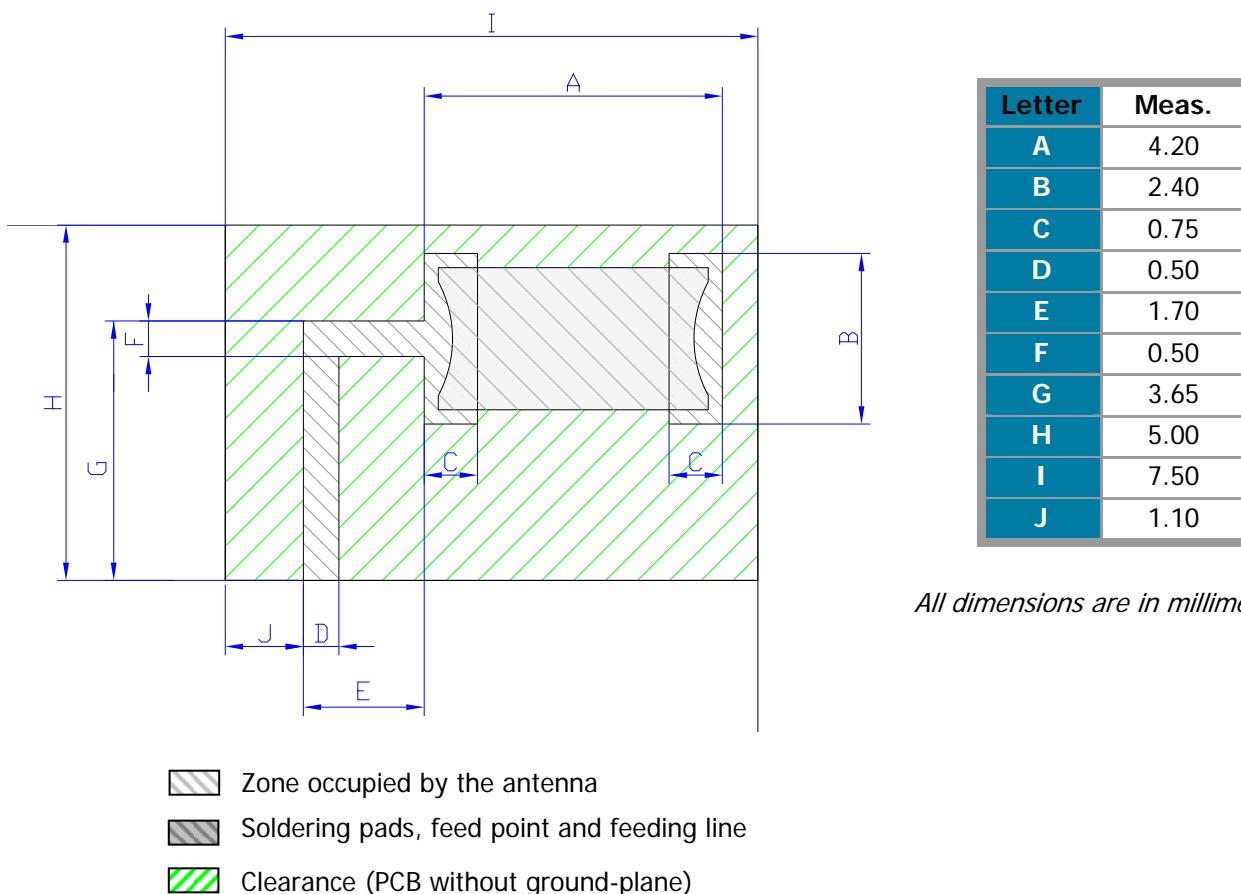


Figure 6 – Antenna Footprint Details

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:

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PACKAGING

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

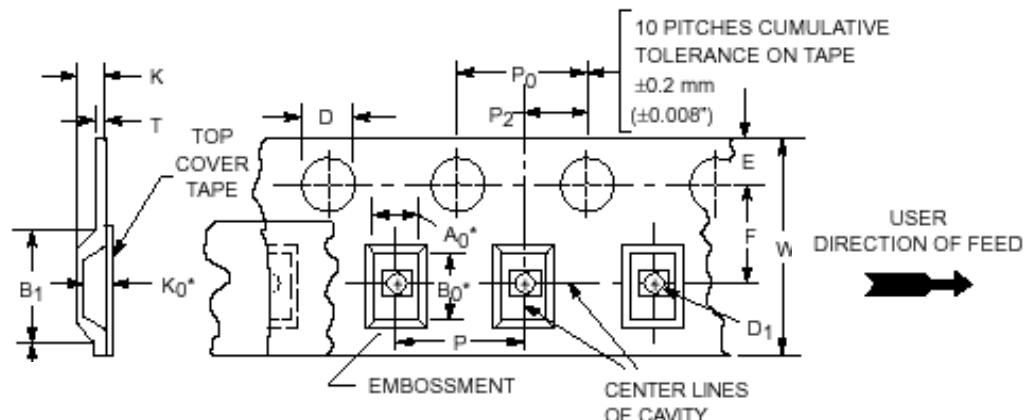


Figure 7 – Tape Dimensions

TAPE SIZE	12	Wmax	12.5
A0	2.3	E	1.25
B0	4.1	F	5.5
K0	1.5	K	2.4 max
B1	8.2 max	P	4.0
D	1.55	P0	4.0
D1	1.5 min	P2	2.0

All dimensions are in millimetres (mm).

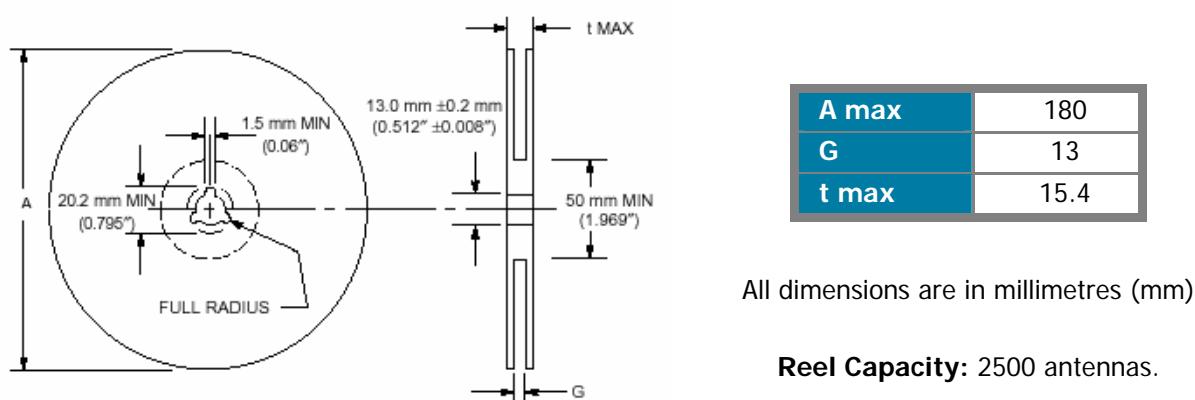
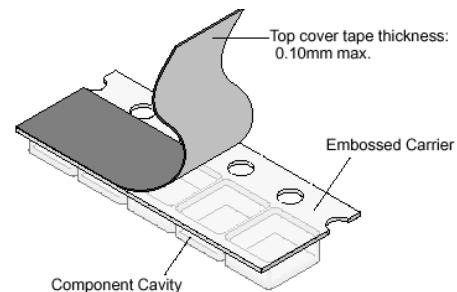


Figure 8 – Reel Dimensions and Capacity