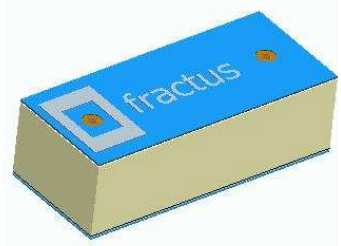
Fractus Compact Reach Xtend™

Bluetooth®, 802.11b/g WLAN

Chip Antenna



Antenna Part Number:
FR05-S1-N-0-102

ISO 9001
BUREAU VERITAS
Certification

RoHS
2002/95/EC

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Fractus is an ISO 9001:2000 certified company
All our antennas are lead-free and RoHS compliant

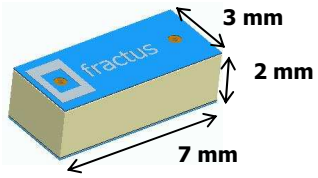
NOTES

The product described in this document is protected worldwide by the following Patents and Patent Applications owned by Fractus: US7148850, US7164386, US7202822; PAT.PEND.WO0154225. Any update on new patents linked to this product will appear in http://www.fractus.com/index.php/fractus/patents

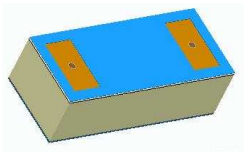
ANTENNA DESCRIPTION

Fractus® Compact Reach Xtend™ chip antenna is engineered specifically for Bluetooth®, WLAN 802.11 b/g and other wireless devices operating at the ISM 2.4 GHz band. Compact Reach Xtend combines small form factor size and high performance to improve the functionality of your wireless devices.

The Compact Reach Xtend is a low-cost antenna solution that combines small form factor and high performance with integration flexibility making it ideal for small consumer electronics devices such as wireless headsets and USB dongles.



Front



Back

APPLICATIONS

- Wireless Headsets
- WLAN 802.11 b/g USB-dongles
- Bluetooth USB and serial Dongles
- Compact Flash (CF) and Secure Digital (SD) cards
- Cellular handsets
- Digital Cameras

BENEFITS

- Low cost
- High efficiency
- Small form factor

QUICK REFERENCE GUIDE

Technical Features	
Frequency range	2400-2500 MHz
Radiation Efficiency	> 70%
Radiation Pattern	Omnidirectional
Peak Gain	> 1 dBi
VSWR	< 2:1
Polarization	Linear
Weight	0.1 g
Temperature	-40 to + 85ºC
Impedance	50Ω
Dimensions	7x3x2 mm (L x W x H)

Table 1 - *Technical Features*

Note : results measured in a reference evaluation board of 47x23 mm 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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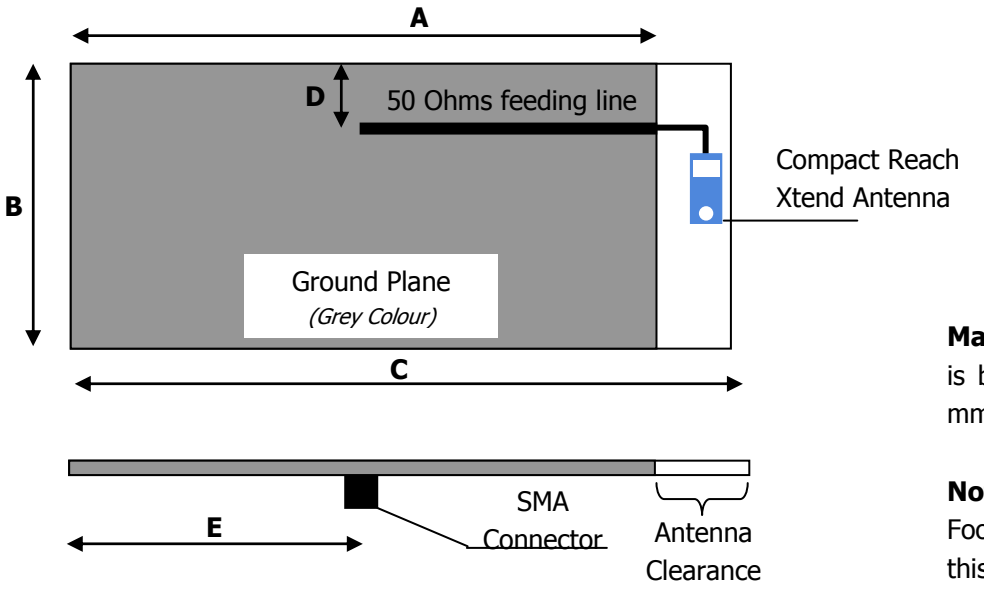
ELECTRICAL PERFORMANCE

FRACTUS EVALUATION BOARD

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



A	41.0 mm
B	23.0 mm
C	47.0 mm
D	8.0 mm
E	26.0 mm

Figure 1 – *Compact Reach Xtend Evaluation Board*

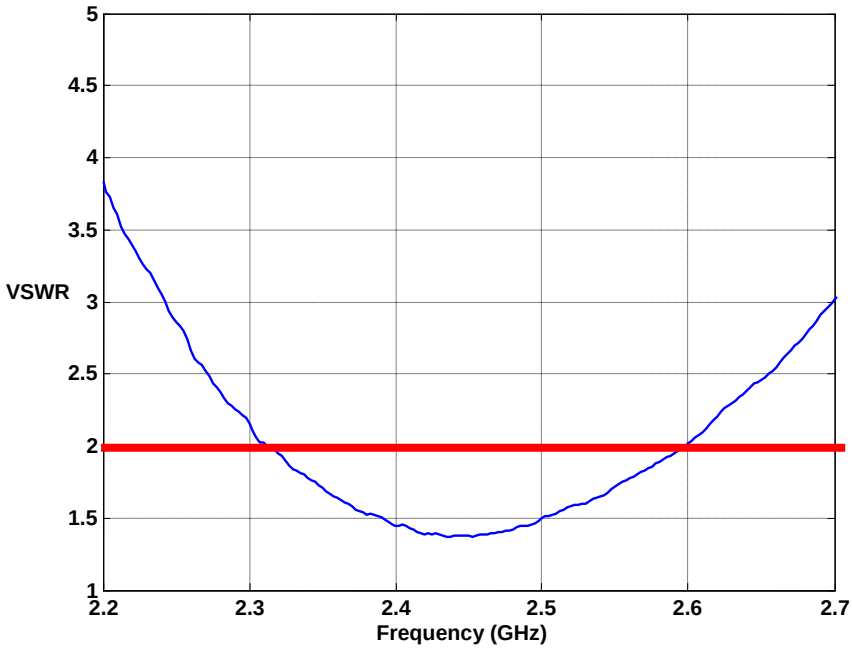
Material: the evaluation board is built on FR4 substrate of 1.0 mm of thickness.

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

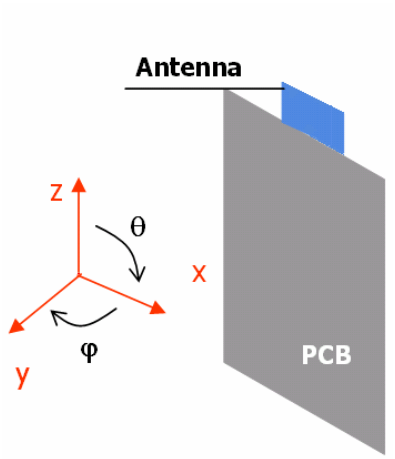
VSWR

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

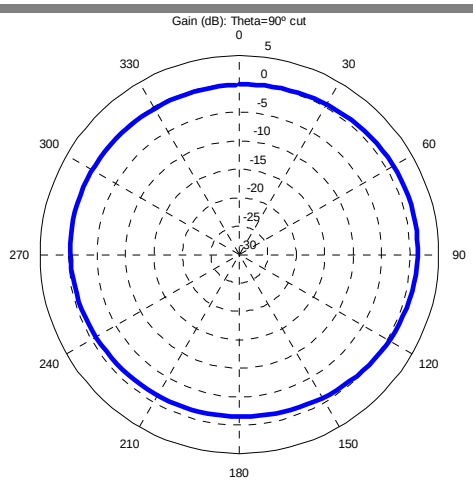
- <2:1 within the ISM-2.4 GHz band
  - 2.4-2.483 in US and Europe
  - 2.471-2.497 in Japan



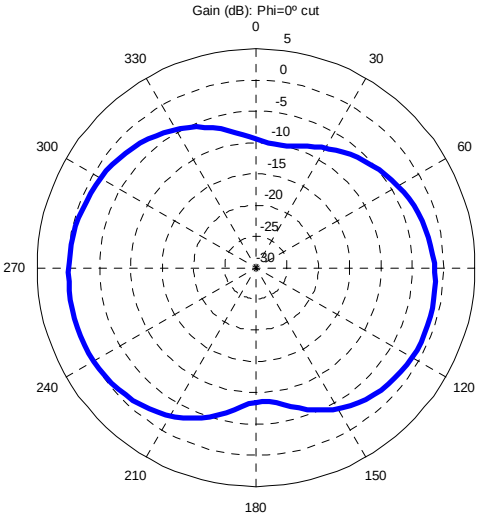
Radiation Pattern, Gain and Efficiency



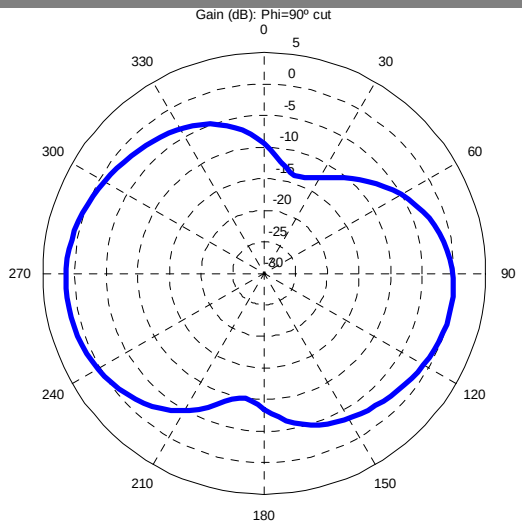
Orientation



Azimuth Cut θ = 90º



Elevation Cut ϕ = 0



Elevation Cut ϕ = 90

Gain	Peak Gain	1.5 dBi
	Average Gain	-2.3 dBi
Efficiency	Peak Efficiency	75 %
	Average Efficiency	70 %

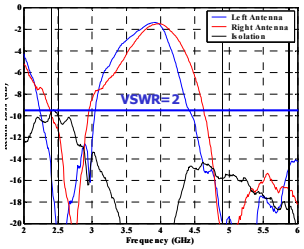
Table 2 – *Antenna Gain and Efficiency within the 2.4-2.5 GHz band*

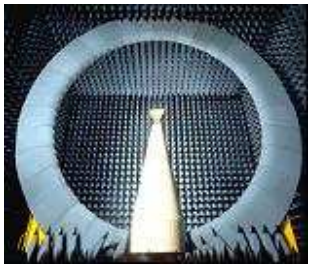
CAPABILITIES AND MEASUREMENT SYSTEMS

Fractus specialises in designing and manufacturing optimsed 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.

R&S VNA 20Khz-8GHz ZVCE

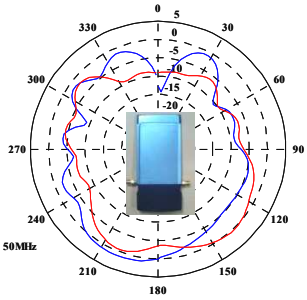
VSWR
&
S Parameters

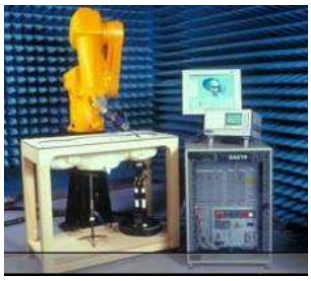




SATIMO's STARGATE 32

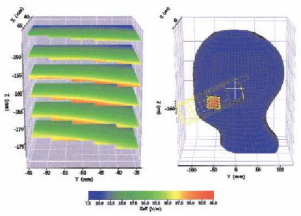
Radiation
Pattern
&
Efficiency





DASY-4 (SPEAG)

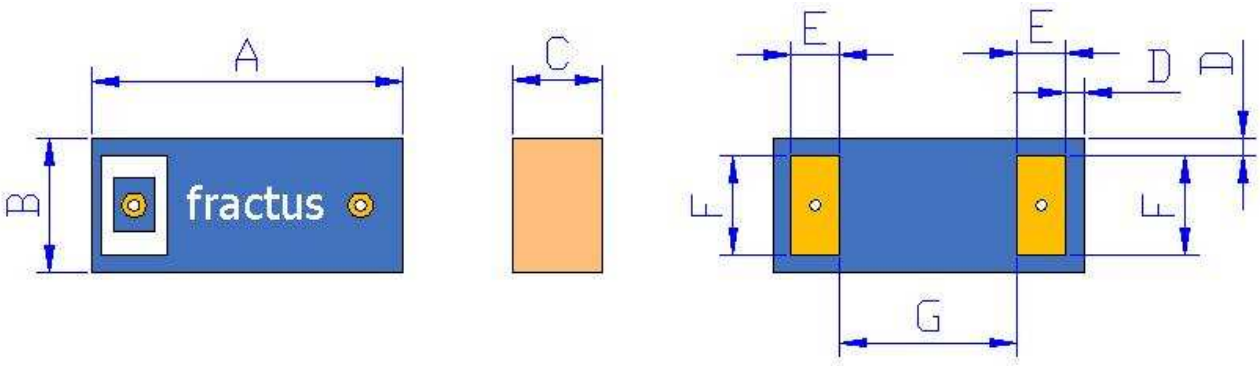
SAR Levels



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

MECHANICAL CHARACTERISTICS

DIMENSIONS, TOLERANCES & MATERIALS



Front side **Back side**

Figure 2 – *Antenna Dimensions and Tolerances*

A	7.00 ± 0.20	**E**	1.10 ± 0.10
B	3.00 ± 0.20	**F**	2.20 ± 0.10
C	2.00 ± 0.20	**G**	4.00 ± 0.20
D	0.40 ± 0.15		

All dimensions are in millimetres (mm)

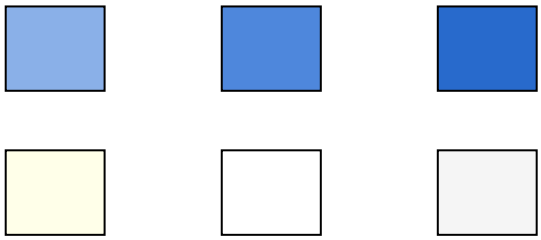
The white rectangle located on the front side of the antenna provides you with a visual cue to mount the antenna. It is located physically above the feed point of the antenna and has been included to decrease possible manufacturing error.

Fractus Compact Reach Xtend chip antenna is compliant with the 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.

SPECIFICATIONS FOR INK

Blue (pantone 312)	• 50% Blue CARAPACE EMP 110-3245 • 50% White ink CARAPACE
White	• White ink CARAPACE
Black (solder mask)	• Black Taiyo PSR4000

Next figure shows the correct colours of the antenna:



Acceptable colour range

ASSEMBLY PROCESS

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

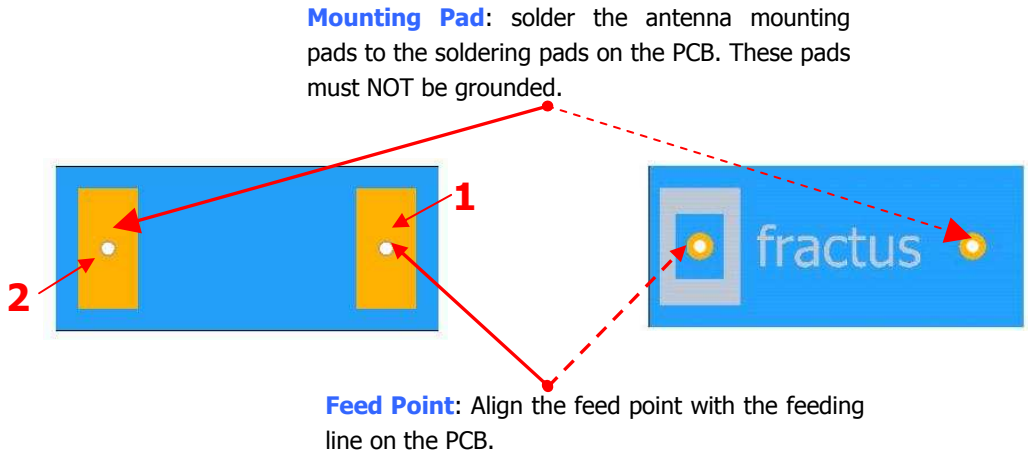


Figure 3 – *Views of the Compact Reach Xtend Chip Antenna.*

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:

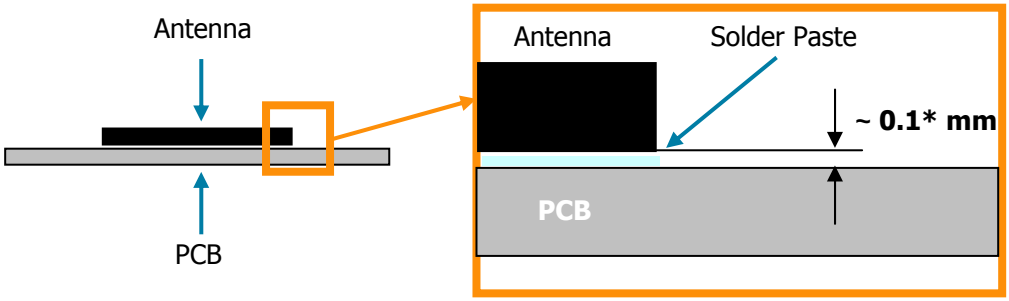


Figure 4 - *Soldering Details*

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 Compact 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_{smax} to Tp)	3 ºC / second (max.)	3 ºC / second (max.)
PREHEAT	- Temperature Min (T_{smin}) - Temperature Max (T_{smax}) - Time (t_{smin} to t_{smax})	100 ºC 150 ºC 60-120 seconds	150ºC 200ºC 60-180 seconds
REFLOW	- Temperature (T_L) - Total Time above T_L (t_L)	183 ºC 60-150 seconds	217 ºC 60-150 seconds
PEAK	- Temperature (T_p) - Time (tp)	235 ºC 10-30 seconds	260 ºC 20-40 second
RAMP-DOWN	Rate	6 ºC / second max.	6 ºC/second max.
Time from 25 ºC 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.

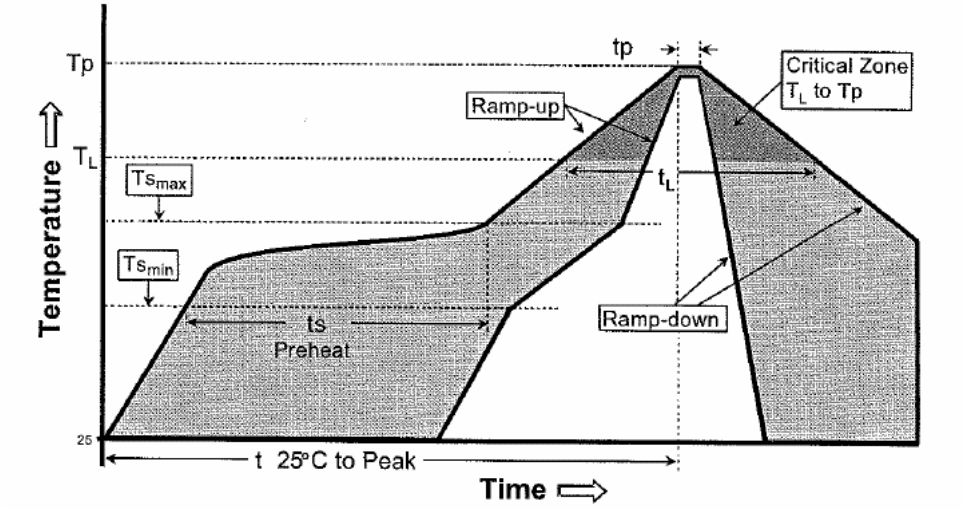
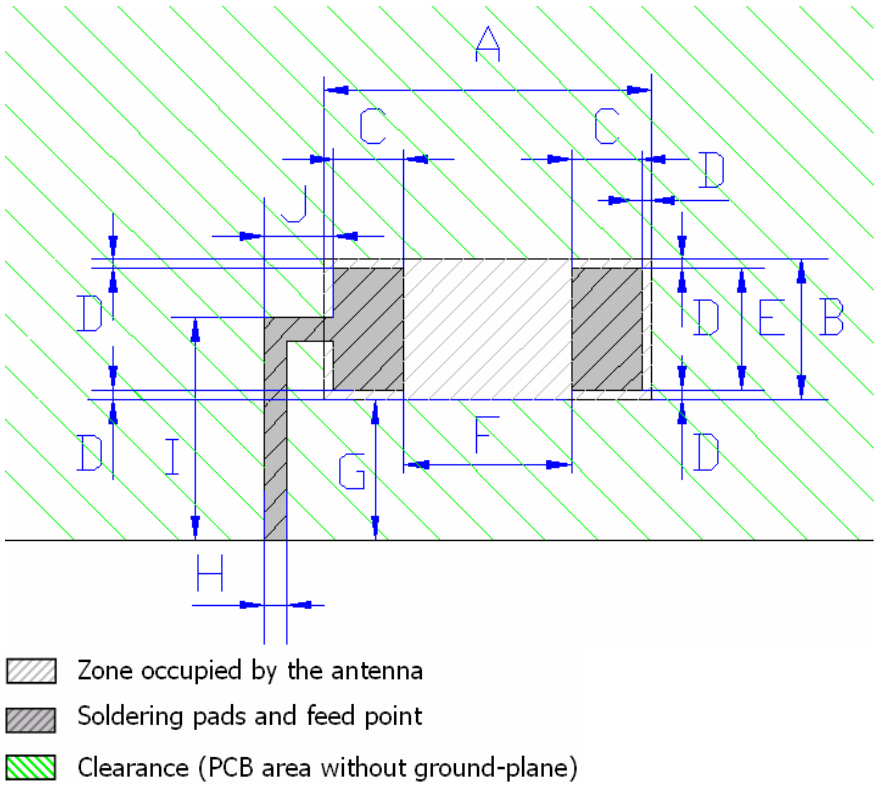


Figure 5 – *Temperature profile*

ANTENNA FOOTPRINT

This antenna footprint applies for 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.



Letter	Meas.
A	7.00
B	3.00
C	1.50
D	0.20
E	2.60
F	3.60
G	3.00
H	0.50
I	4.75
J	1.50

All dimensions are in millimetres.

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 wireless@fractus.com to get additional information on recommended configurations for different devices:

FRACTUS S.A.
www.fractus.com,
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Fax: +34 935442691

PACKAGING

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

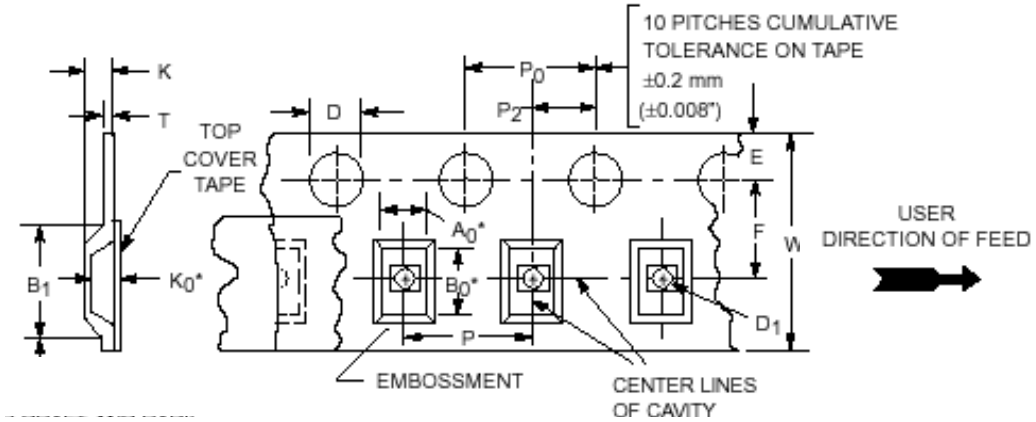
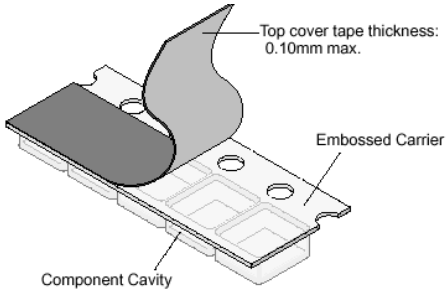
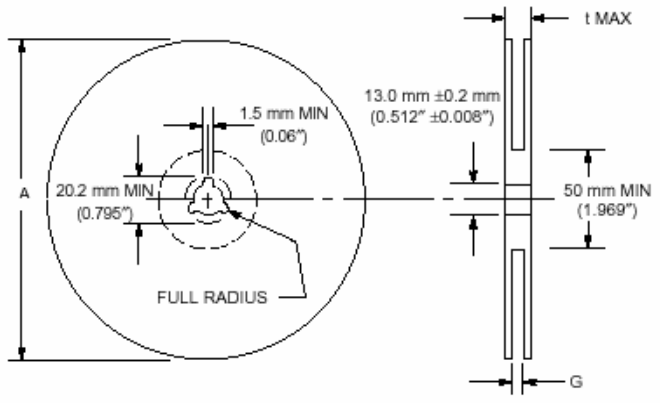


Figure 7 – *Tape Dimensions*

TAPE WIDTH	16	Wmax	16.3
A0	3.8	E	1.7
B0	7.8	F	7.5
K0	2.3	K	2.6 max
B1	8.2 max	P	8.0
D	1.5	P0	4.0
D1	1.5 min	P2	2.0

All dimensions are in millimetres (mm).





A max	330
G	16.4
t max	22.4

All dimensions are in millimetres (mm)

Reel Capacity: 2500 antennas.

Figure 8 – *Reel Dimensions and Capacity*