



Fractus EZConnect™

Zigbee, RFID, ISM868/900

Chip Antenna



**Antenna Part Number:
FR05-S1-R-0-105**



ISO 9001
BUREAU VERITAS
Certification





TABLE OF CONTENTS

NOTES	2
ANTENNA DESCRIPTION	3
QUICK REFERENCE GUIDE	3
FRACTUS EVALUATION BOARD	4
CAPABILITIES AND MEASUREMENT SYSTEMS	6
MECHANICAL CHARACTERISTICS	7
DIMENSIONS, TOLERANCES & MATERIALS	7
SPECIFICATIONS FOR INK	8
ASSEMBLY PROCESS	9
ANTENNA FOOTPRINT	11
PACKAGING	12

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

NOTES

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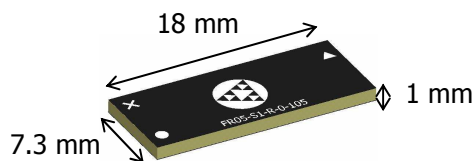
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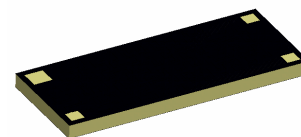
ANTENNA DESCRIPTION

The Fractus® EZConnect antenna has been specifically designed for wireless devices using Zigbee, RFID and other wireless standards operating at the ISM 868/900 MHz bands.

EZConnect antenna uses the space-filling properties of fractal technology to become one of the smallest antennas for ISM868/900 applications. Additionally, the antenna maintains a high radiation efficiency that helps to improve the battery life of your devices and features an omnidirectional radiation pattern optimal for highly scattered environments such as indoor environments and public spaces.



Front



Back

APPLICATIONS

- Home and Industrial applications using Zigbee wireless standard.
- RFID (900 MHz)
- Wide range of PCB form factors: USB Dongles, PDAs, Mobile phones, PCMCIA's

BENEFITS

- Small size
- High efficiency
- Low cost

QUICK REFERENCE GUIDE

Technical features ⁽¹⁾	
Frequency range ⁽²⁾	902-928 MHz
Radiation Efficiency	> 40%
Peak Gain	> 0 dBi
Radiation Pattern	Omnidirectional
VSWR	< 2:1
Polarization	Linear
Weight	0.2 g
Temperature	-40 to + 85°C
Impedance	50Ω unbalanced
Dimensions	18x7.3x1 mm (L x W x H)

Table 1 - Technical Features

Notes:

- (1) Results measured in a reference evaluation board of 121x48 mm described in the following section.
- (2) Contact your sales representative at wireless@fractus.com to obtain specific PCB configurations for the 868 MHz band.

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 configuration used in testing the EZConnect chip antenna is displayed in Figure 1.

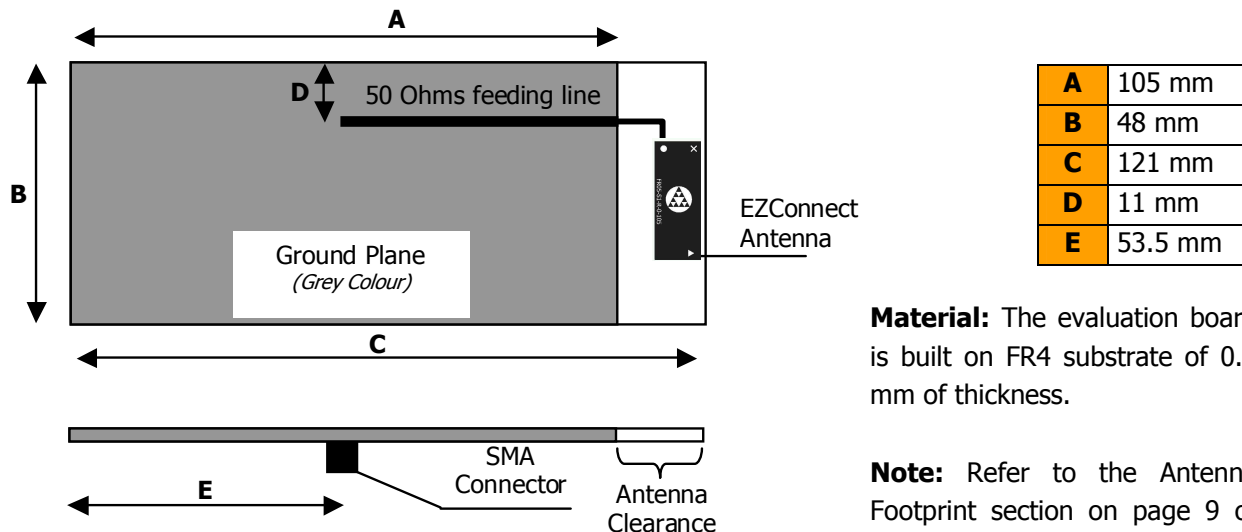


Figure 1 – EZConnect Evaluation Board

Material: The evaluation board is built on FR4 substrate of 0.8 mm of thickness.

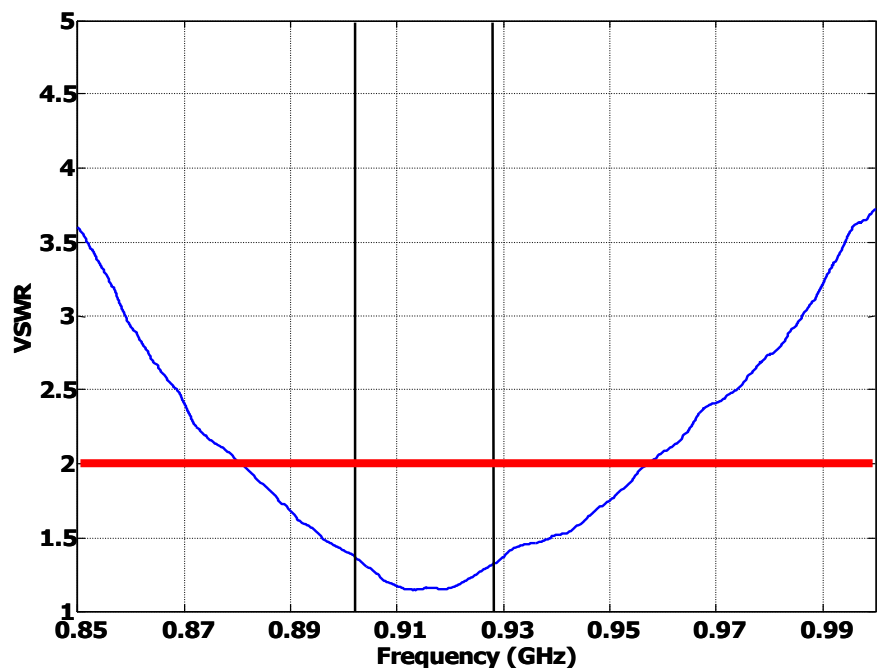
Note: Refer to the Antenna Footprint section on page 9 of this User Manual for additional information about the clearance area and antenna footprint.

VSWR

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

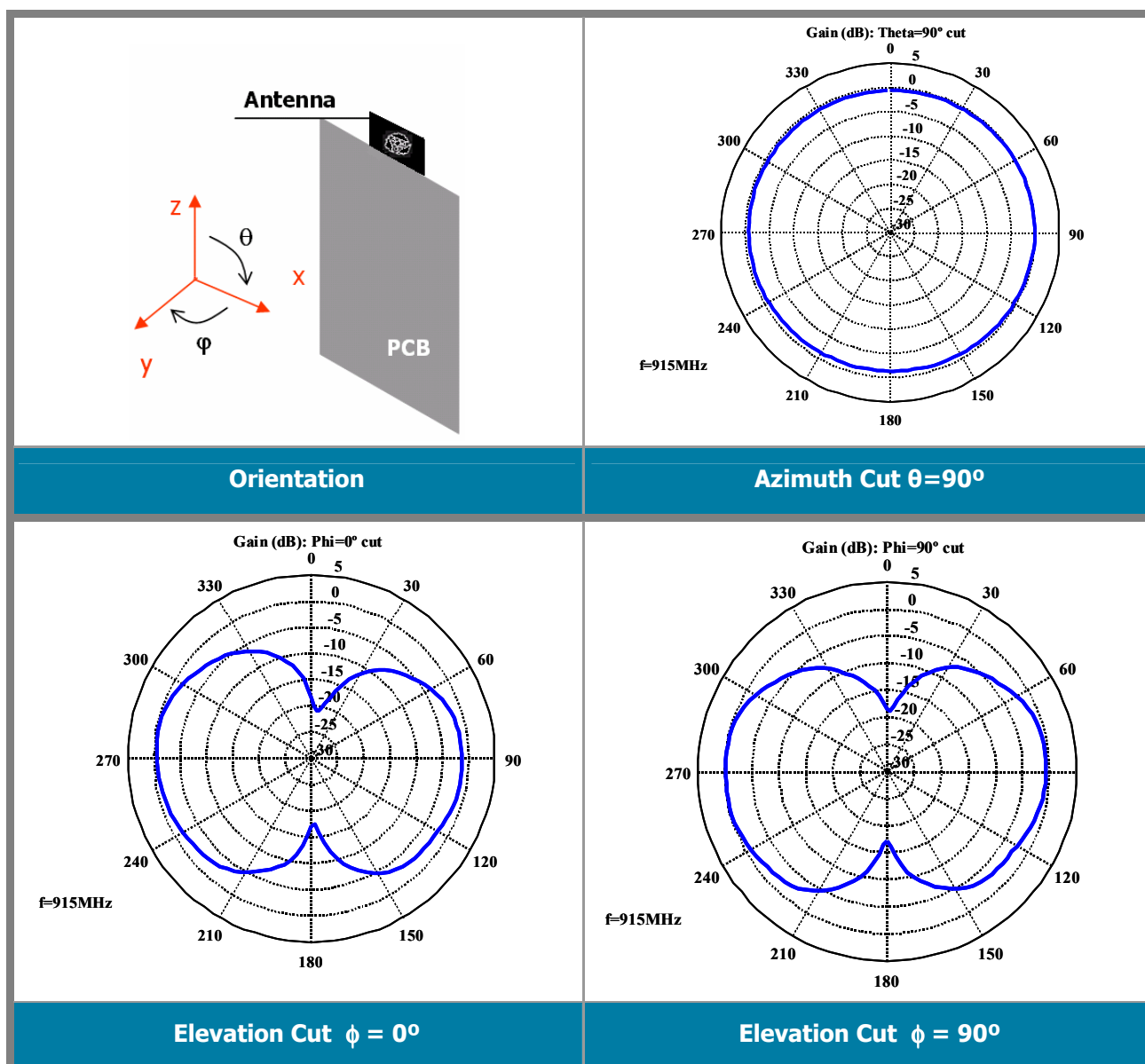
- <2:1 [902-928MHz]

Please, contact your local sales representative at wireless@fractus.com to receive additional details of the performance of the antenna on configurations for the ISM868 MHz band.





RADIATION PATTERN, GAIN AND EFFICIENCY



Gain	Peak Gain	0.0 dBi
	Average Gain	-5.8 dBi
Efficiency	Peak Efficiency	60.6 %
	Average Efficiency	58.2 %

Table 2 – Antenna Gain and Efficiency within the 902-928 MHz band.



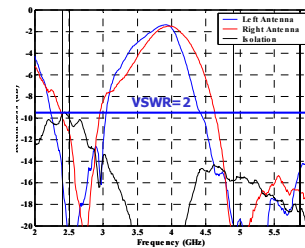
CAPABILITIES AND MEASUREMENT SYSTEMS

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.



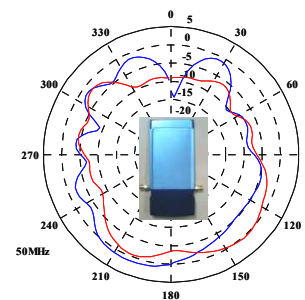
R&S VNA 20KHz-8GHz ZVCE

VSWR
&
S Parameters



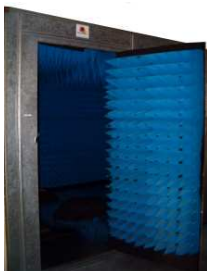
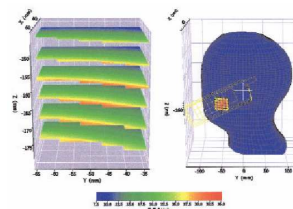
SATIMO's STARGATE 32

Radiation
Pattern
&
Efficiency



DASY-4 (SPEAG)

SAR Levels



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



MECHANICAL CHARACTERISTICS

DIMENSIONS, TOLERANCES & MATERIALS

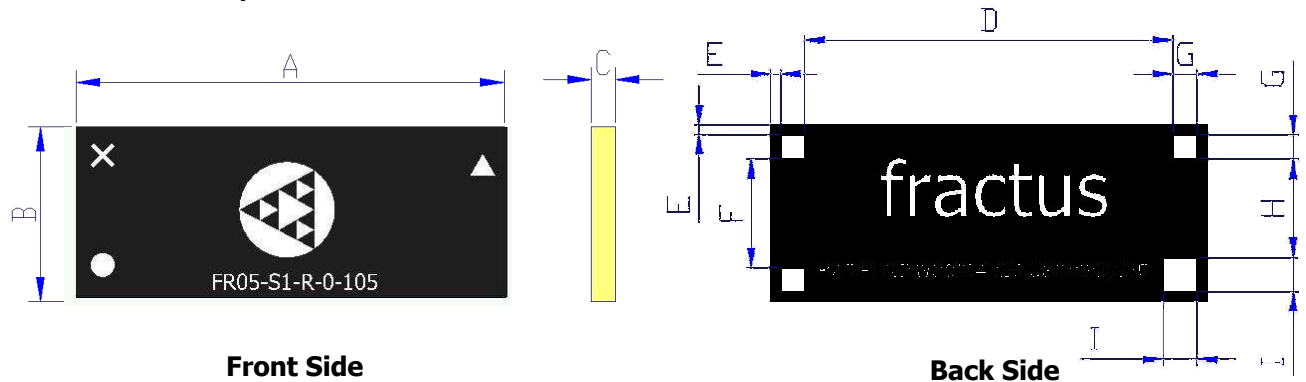


Figure 2 – Antenna Dimensions and Tolerances

A	18.000 ± 0.200	F	4.500 ± 0.100
B	7.300 ± 0.200	G	1.000 ± 0.050
C	1.000 ± 0.200	H	4.100 ± 0.100
D	15.200 ± 0.200	I	1.400 ± 0.050
E	0.400 ± 0.100		

All dimensions are in millimetres (mm)

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

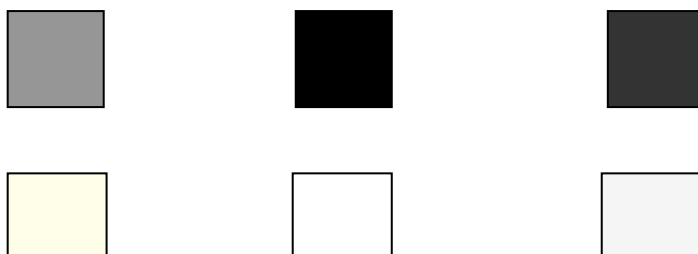
Fractus EZConnect antenna is compliant with the directive **2002/95/EC** on the restriction of the use of hazardous substances (**RoHS**). Should you require a green certificate (RoHS report), please contact your sales representative at wireless@fractus.com.



SPECIFICATIONS FOR INK

Black	Black Taiyo PSR4000 EG23
White	Lektrachem Technimask ISR1000E/900S

Next figure shows the correct colours of the antenna:



Acceptable colour range



ASSEMBLY PROCESS

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

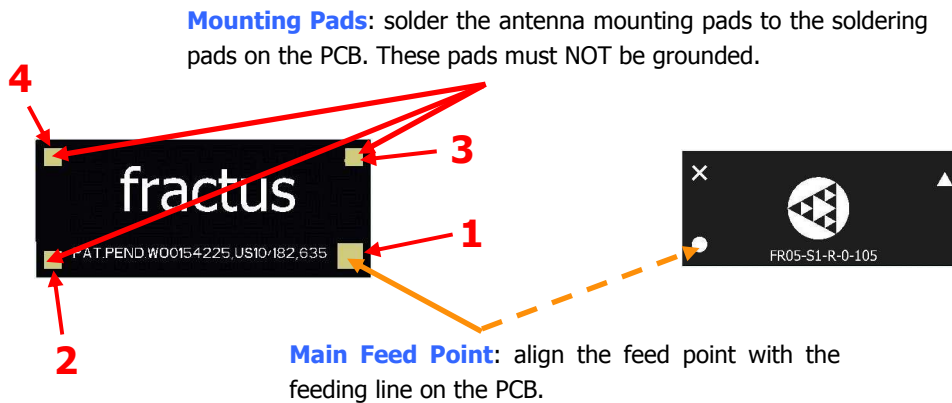


Figure 3 – Views of the EZConnect Chip Antenna

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 and 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:

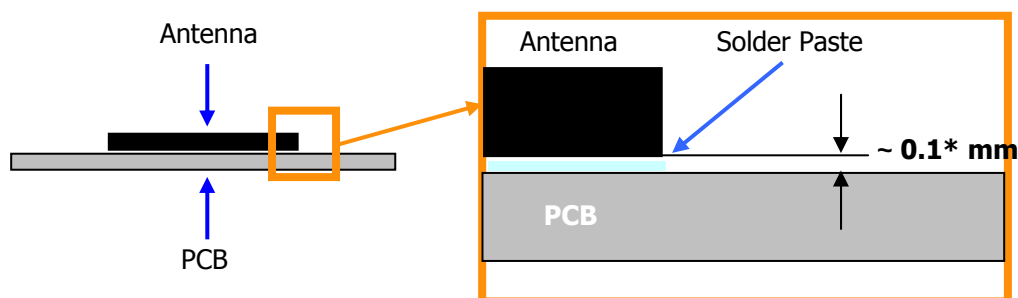


Figure 4 - Soldering Details

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 EZConnect 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 T_p)	3 °C / second (max.)	3 °C / second (max.)
PREHEAT	- Temperature Min (T_{smin}) - Temperature Max (T_{smax}) - Time (t_{smin} to t_{smax})	100 °C 150 °C 60-120 seconds	150°C 200°C 60-180 seconds
REFLOW	- Temperature (T_L) - Total Time above T_L (t_L)	183 °C 60-150 seconds	217 °C 60-150 seconds
PEAK	- 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 reflow ovens.

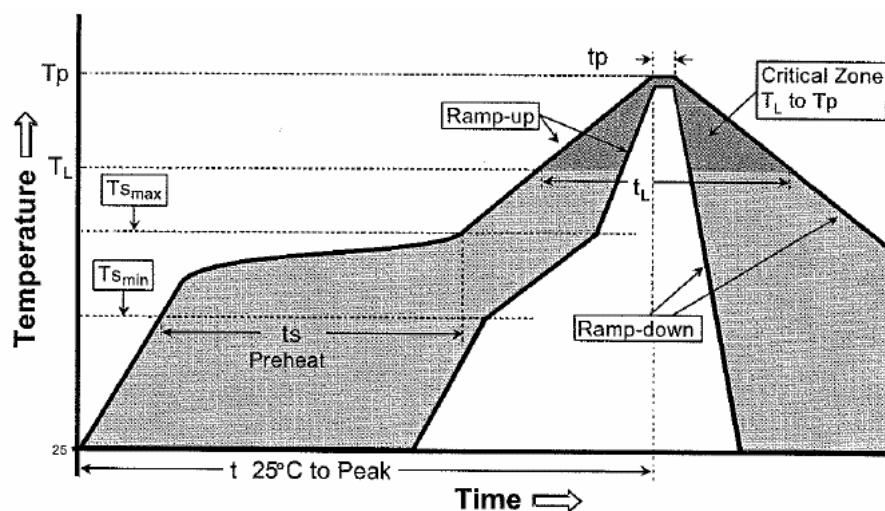


Figure 5 – Temperature profile



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 5 applies for a 0.8 mm thickness FR4 PCB.

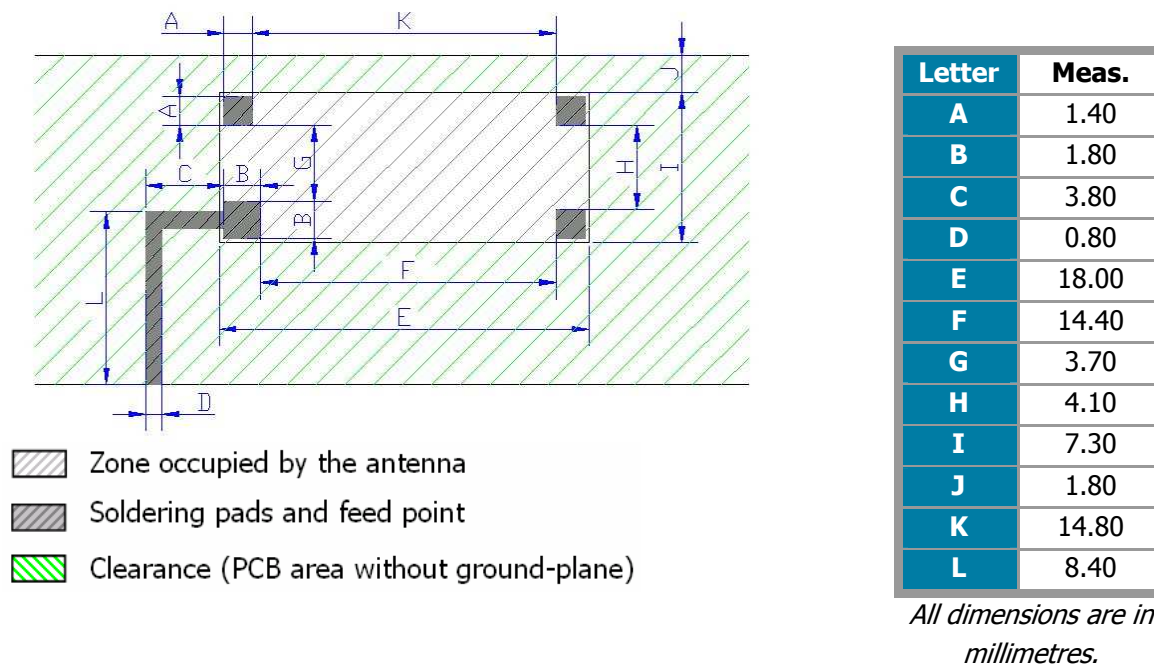


Figure 6 – Antenna Footprint Details

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

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PACKAGING

The EZConnect chip antenna is available in tape and reel packaging.

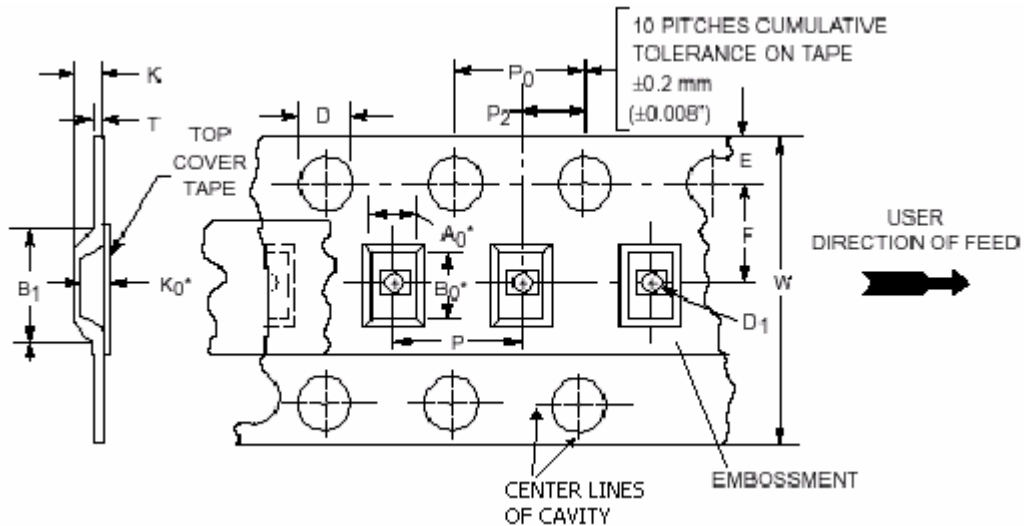
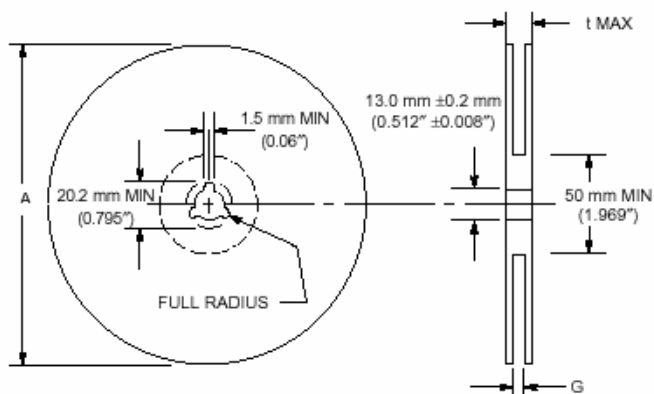


Figure 6 –Tape Dimensions

TAPE SIZE	32	Wmax	32.3
A0	8.0	E	1.8
B0	19.0	F	14.2
K0	1.1	K	1.4 max
B1	19.0 max	P	12.0
D	1.6	P0	4.7
D1	2.1 min	P2	1.6

All dimensions are in millimetres (mm).



A max	330
G	32.4
t max	38.4

All dimensions are in millimetres (mm)

Reel Capacity: 2500 antennas.

Figure 7 – Reel Dimensions and Capacity