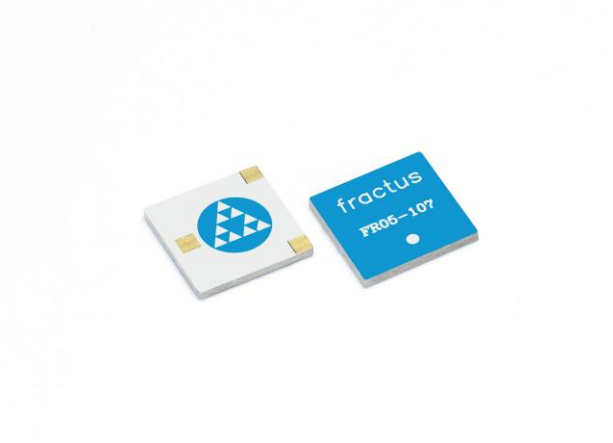
Media+™ UWB (FR01-S1-P-0-107)

Fractus Antennas specializes in enabling effective mobile communications. Using Fractus technology, we design and manufacture optimized antennas to make your wireless devices more competitive. Our mission is to help our clients develop innovative products and accelerate their time to market through our expertise in antenna design, testing and manufacturing.



Media+™ UWB

FR05-S1-P-0-107

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Fractus Antennas is an ISO 9001:2015 certified company. All our antennas are lead-free and RoHS compliant.

ISO 9001: 2015 Certified

RoHS 2002/95/EC

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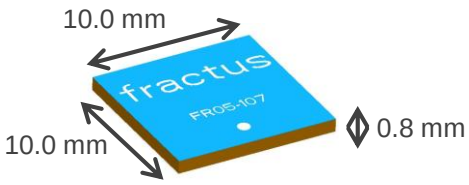
1. ANTENNA DESCRIPTION

The Media+™ UWB chip antenna is a high-performance, cost-effective antenna designed to meet the requirements of reference designers, OEMs and ODMs considering the Multiband OFDM alliance (MBOA) recommendations for Ultra Wideband devices.

The electrical and mechanical characteristics of this small SMD monopole chip antenna ensures design flexibility and optimal performance in devices such as, but not limited to:

- Wireless USB (W-USB) dongles
- W-USB enabled devices: digital cameras and video recorders, PC Peripherals, beamers, Mobile Phones, etc...

TOP



BOTTOM

Material: The Media+™ UWB antenna is built on glass epoxy substrate.

APPLICATIONS

- UWB Devices
- Modules
- Handsets

BENEFITS

- High efficiency
- Cost-effective
- Small size
- Easy to use (pick and place)

2. QUICK REFERENCE GUIDE

Technical Features	
Frequency Range	3.1 – 5 GHz
Average Efficiency	84.0%
Peak Gain	3.5 dBi
Radiation Pattern	Omnidirectional
Flatness	2 dB gain variation
Weight (approx.)	0.2 g
Temperature	-40 to 85º C
Impedance	50 Ω
Dimensions (L x W x H)	10.0 mm x 11.0 mm x 0.8 mm

Table 1 – Technical Features. Measures from the evaluation board. See Figure 1.

Please contact info@fractusantennas.com if you require additional information on antenna integration or optimization on your PCB.

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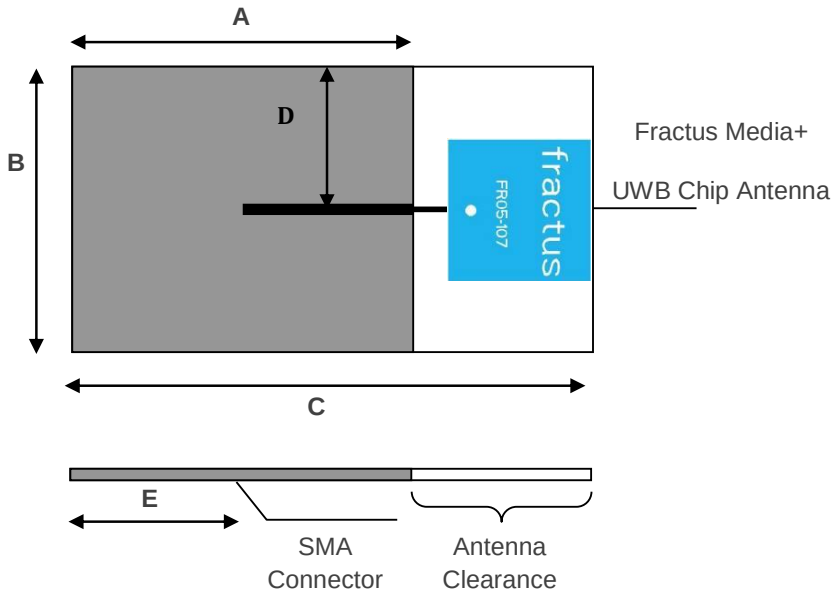
3. ELECTRICAL PERFORMANCE

3.1. Media+™ UWB EVALUATION BOARD

The configuration used in testing the Media+™ UWB antenna is displayed in Figure 1.



Measure	mm
A	23.9
B	20.0
C	36.5
D	10.0
E	12.0

Tolerance: ±0.2mm

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

Figure 1 – EB_FR05-S1-P-0-107. Media+™ UWB Evaluation Board.

3.2. VSWR AND EFFICIENCY

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

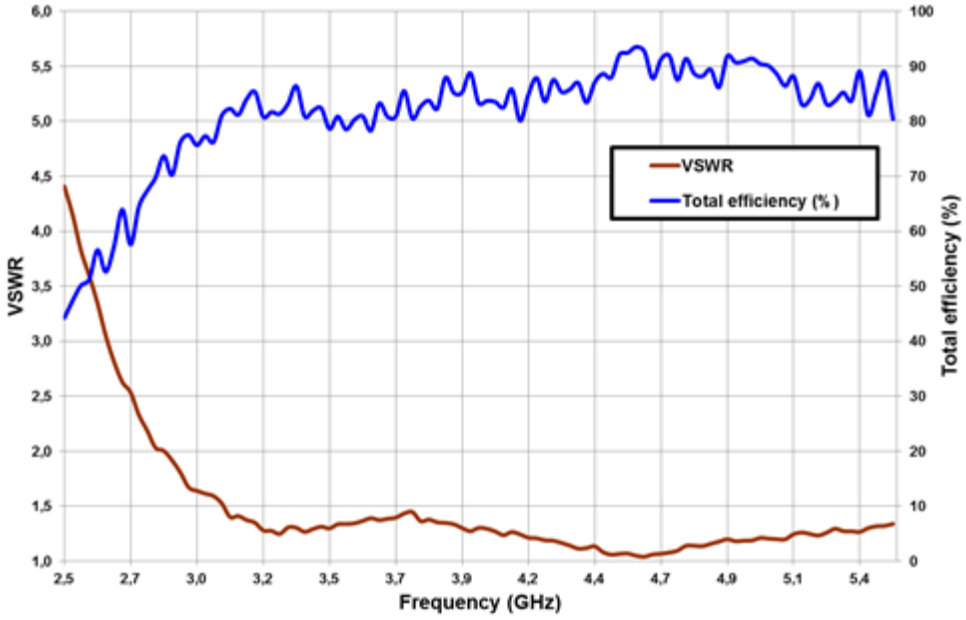


Figure 2 – VSWR and Efficiency (%) vs. Frequency (GHz).

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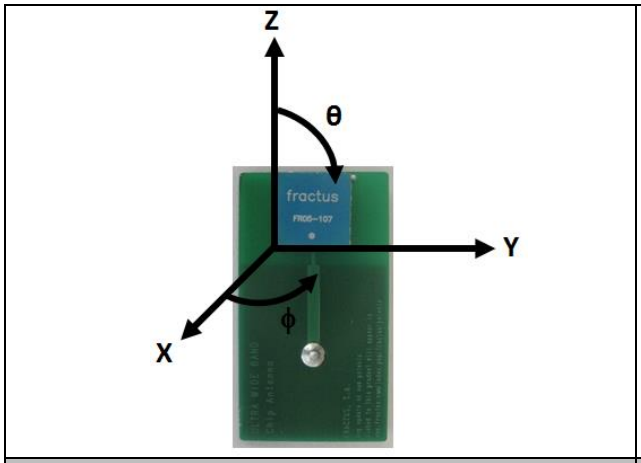
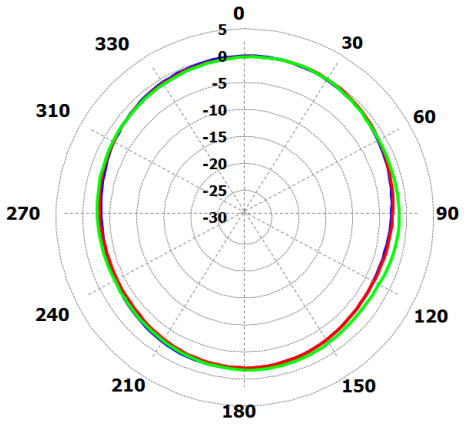
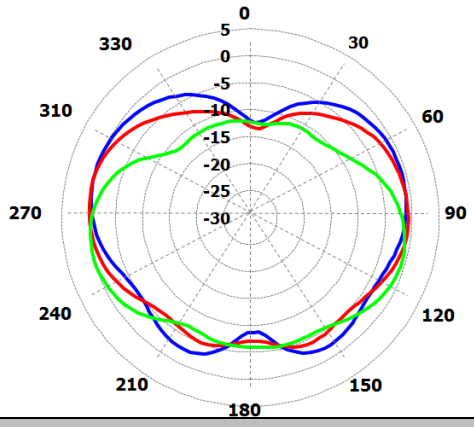
3.3. RADIATION PATTERNS, GAIN AND EFFICIENCY



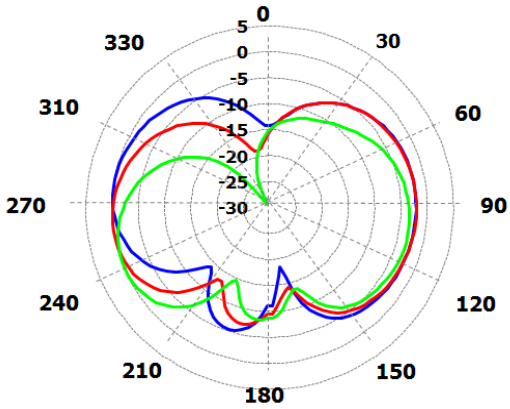
Orientation: Antenna in Plane ZY



θ = 90º(3.1GHz, 4GHz, 5GHz) Plane XY



φ = 90º(3.1GHz, 4GHz, 5GHz) Plane YZ



φ = 0º (3.1GHz, 4GHz, 5GHz) Plane XZ

Gain	Peak Gain	3.5 dBi
	Average Gain across the band	2.6 dBi
	Gain Flatness (horizontal plane)	< 2 dB
Efficiency	Peak Efficiency	92.0 %
	Average Efficiency across the band	84.0 %
	Efficiency Range across the band (min, max)	77.0 – 92.0 %

Table 2 – Antenna Gain and Efficiency within the 3.1 to 5 GHz bandwidth. Measures made in the evaluation board and in the Satimo STARGATE 32 anechoic chamber.

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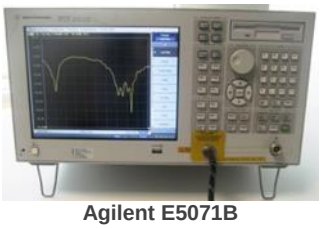
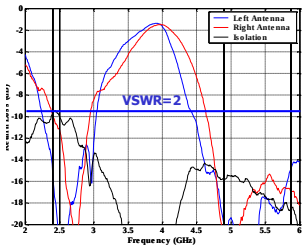
3.4. CAPABILITIES AND MEASUREMENT SYSTEMS

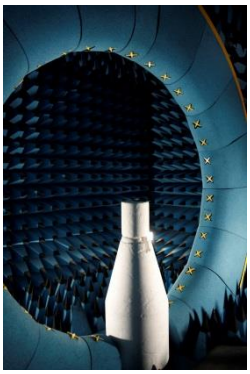
Fractus Antennas specializes in the design and manufacture of optimized antennas for wireless applications, and with the provision of RF expertise to a wide range of clients. We offer turn-key antenna products and antenna integration support to minimize your time requirements and maximize return on investment throughout the product development process. 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

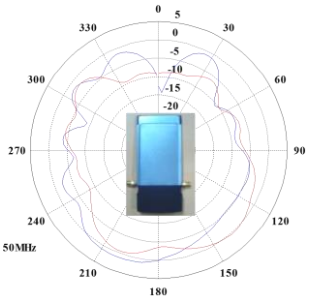
VSWR
&
S Parameters

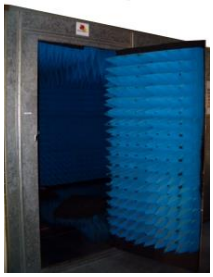




SATIMO STARGATE 32

Radiation
Pattern
&
Efficiency





Anechoic chambers and full equipped in-house lab

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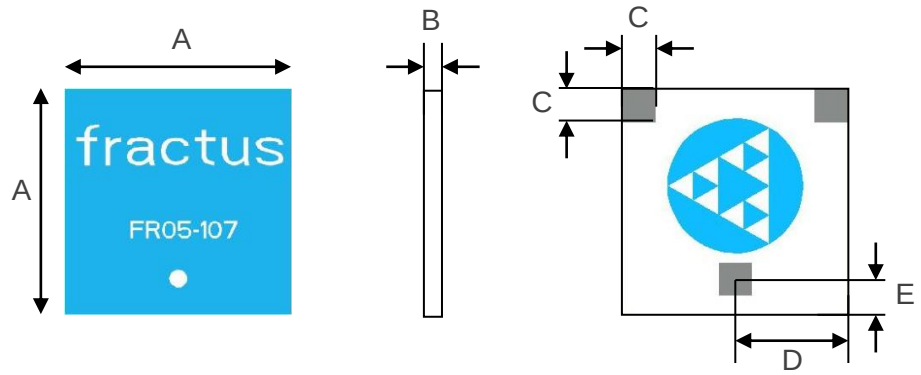
4. MECHANICAL CHARACTERISTICS

4.1. DIMENSIONS AND TOLERANCES



Note: all antenna pads (feed point and mounting pads) have the same dimensions.

The white circle located on the top side of the antenna indicates the feed pad.

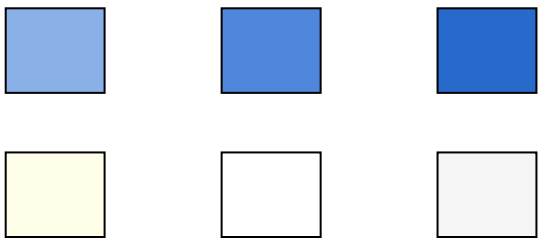
Measure	mm	Measure	mm
A	10.0 ± 0.2	**D**	5.0 ± 0.2
B	0.8 ± 0.2	**E**	1.5 ± 0.1
C	1.5 ± 0.1		

Figure 3 – Antenna Dimensions and Tolerances.

Fractus Media+™ UWB chip antenna is compliant with the restriction of the use of hazardous substances (**RoHS**).
The RoHS certificate can be downloaded from www.fractusantennas.com.

4.2. SPECIFICATIONS FOR THE INK

Next figure shows the correct colors of the antenna:



Acceptable color range

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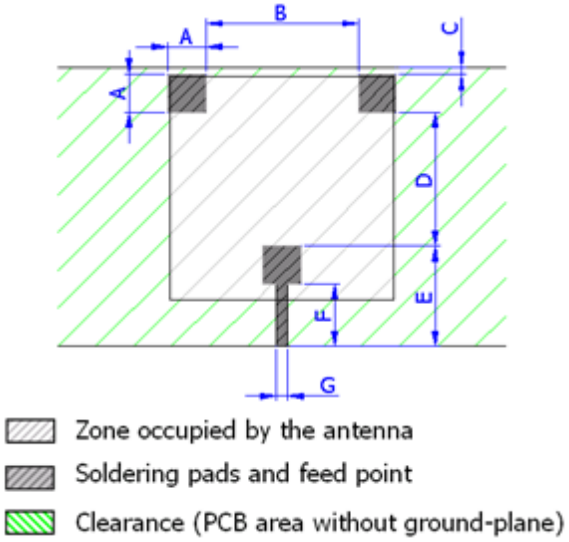
4.3. ANTENNA FOOTPRINT (as used in the evaluation board)

This antenna footprint applies for the reference evaluation board described on page 5 of this User Manual.



Measure	mm
A	1.9
B	6.8
C	0.3
D	6.0
E	4.5
F	2.8
G	0.5

Tolerance: ±0.2 mm

Figure 4 – 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 design, please contact info@fractusantennas.com.

5. MATCHING NETWORK

The specs of a Fractus Antennas standard antenna are measured in their evaluation board, which is an ideal case. In a real design, components nearby the antenna, LCD's, batteries, covers, connectors, etc affect the antenna performance. This is the reason why it is highly recommended placing pads compatible with 0402 and 0603 SMD components for a PI matching network as close as possible to the antenna feeding point. Do it in the ground plane area, not in the clearance area. This is a degree of freedom to tune the antenna once the design is finished and taking into account all elements of the system (batteries, displays, covers, etc).

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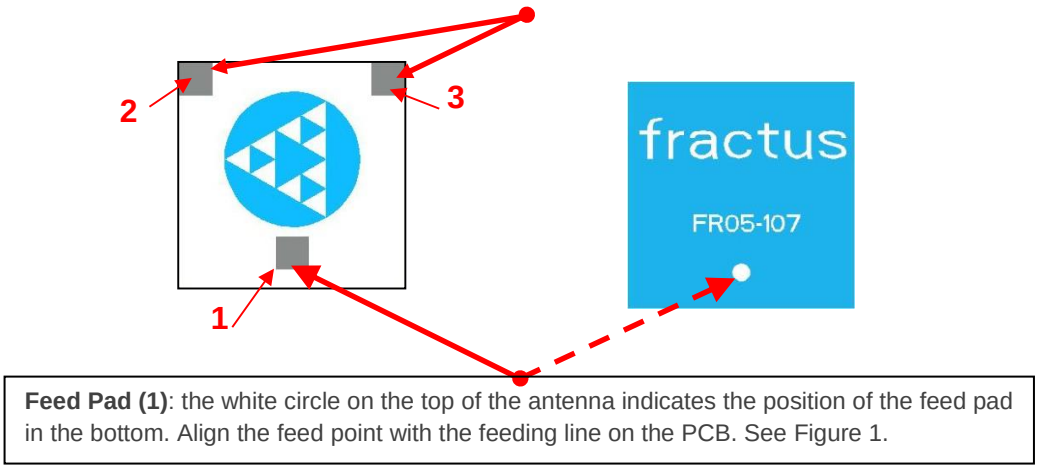
6. ASSEMBLY PROCESS

Figure 5 shows the back and front view of the Fractus Media+™ UWB antenna, and indicates the location of the feeding point and the mounting pads:



Feed Pad (1): the white circle on the top of the antenna indicates the position of the feed pad in the bottom. Align the feed point with the feeding line on the PCB. See Figure 1.

Figure 5 – Pads of the Fractus Media+™ UWB 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 to 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 7 on page 11.
3. After soldering the antenna to the circuit board, perform a cleaning process to remove any residual flux. Fractus Antennas 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:

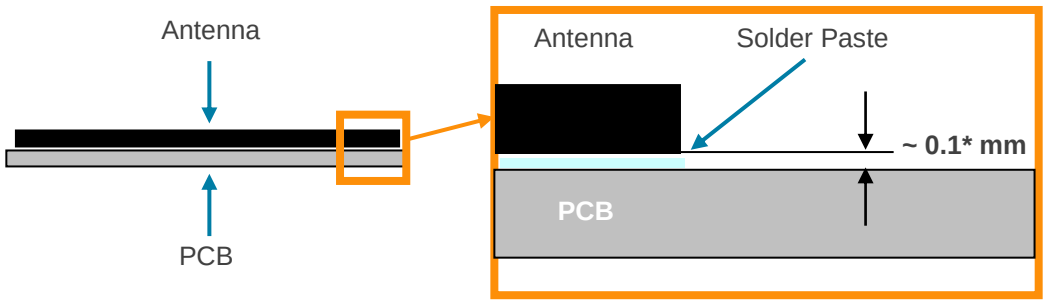


Figure 6 – Soldering Details.

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

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The Fractus Media+™ UWB antenna should 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	Pb-Free Assembly (SnAgCu)
RAMP-UP	Avg. Ramp-up Rate (Tsmax to Tp)	3 ºC / second (max.)
PREHEAT	- Temperature Min (Tsmin) - Temperature Max (Tsmax) - Time (tsmin to tsmax)	150 ºC 200 ºC 60-180 seconds
REFLOW	- Temperature (TL) - Total Time above TL (tL)	217 ºC 60-150 seconds
PEAK	- Temperature (Tp) - Time (tp)	260 ºC 20-40 seconds
RAMP-DOWN	Rate	6 ºC/second max
Time from 25 ºC to Peak Temperature		8 minutes max

Table 3 – Recommended soldering temperatures.

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

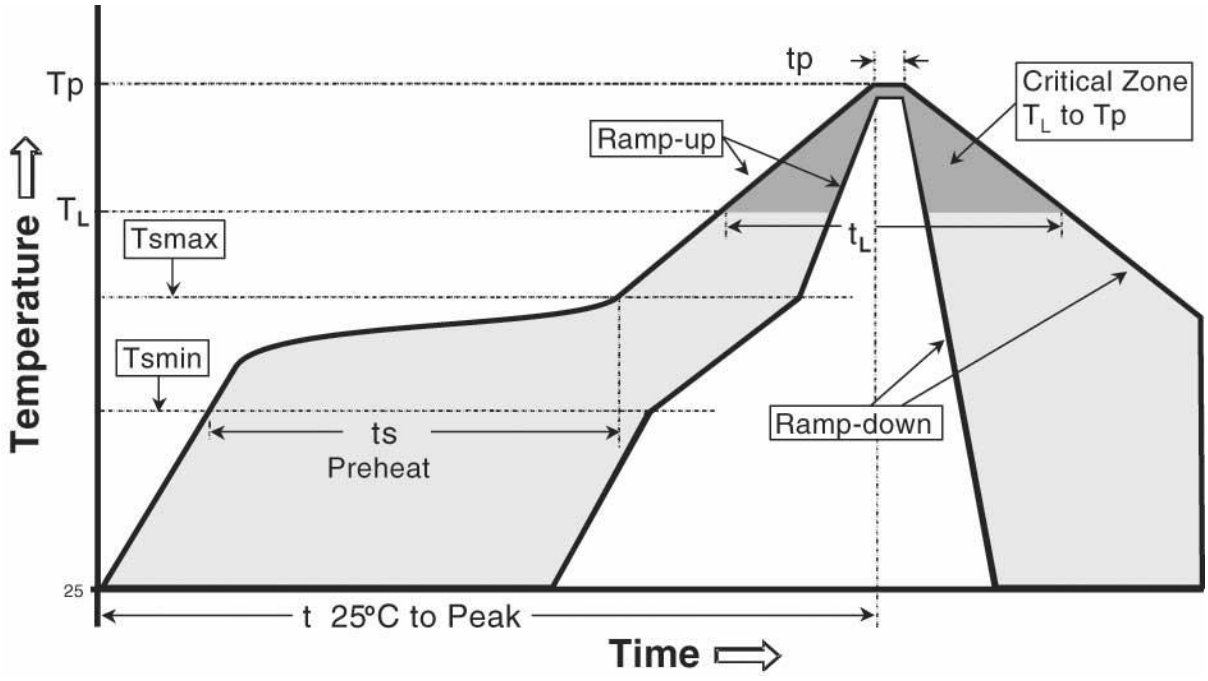

Figure 7 – Temperature profile.

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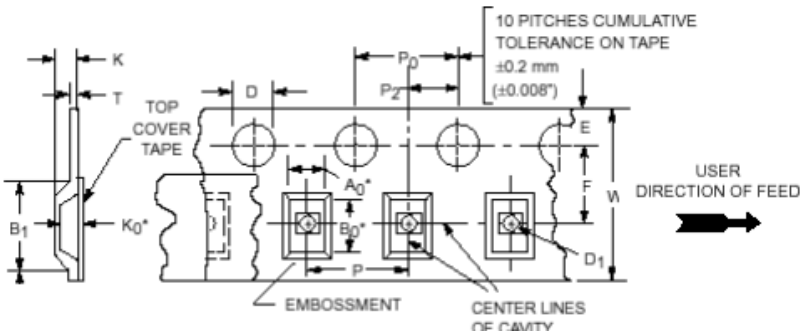
7. PACKAGING

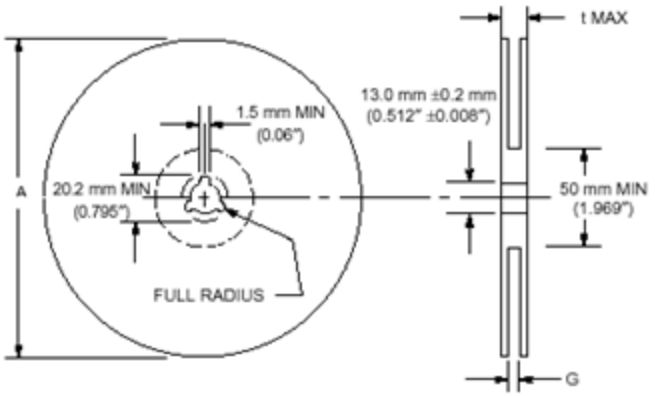
The Fractus Media+™ UWB chip antenna is available in tape and reel packaging.



Measure	mm
W	16.0 ± 0.3
A0	10.5 ± 0.1
B0	10.5 ± 0.1
K0	1.5 ± 0.1
B1	11.1 ± 0.1
D	2.0 ± 0.1
D1	2.0 ± 0.1
Wmax	16.3
E	1.7 ± 0.1
F	7.5 ± 0.1
K	1.8 ± 0.1
P	12.0 ± 0.1
P0	4.0 ± 0.1
P2	2.0 ± 0.1

Figure 8 – Tape Dimensions and Tolerances.

Figure 9 – Image of the tape.



Measure	mm
A max	330.0 ± 1.0
G	17.5 ± 0.1
t max	21.5 ± 0.2

Reel Capacity: 2500 antennas

Figure 10 – Reel Dimensions and Capacity.

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