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Your innovation.
Accelerated.

Slim Reach Xtend™: Bluetooth, Zigbee, 802.11 b/g/n WLAN

USER MANUAL

Slim Reach Xtend™ (NN01-104)

Slim Reach Xtend™ (NN01-104) – Bluetooth®, Zigbee®, 802.11 b/g/n WLAN

Ignion specializes in enabling effective mobile communications. Using Ignion 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.

Slim Reach Xtend™

NN01-104

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

ISO 9001: 2015 Certified

INDEX OF CHAPTERS

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1. ANTENNA DESCRIPTION

The Slim Reach Xtend™ chip antenna is engineered specifically for wireless headsets using Bluetooth® and other wireless standards operating at the ISM 2.4 GHz band.

The Slim Reach Xtend™ antenna has been designed to resonate at 2.65 GHz in free space conditions. This has been done purposely because the human head and plastic housing produce a frequency downshift of 150-250 MHz in the resonance frequency of the antenna. Based on our research and development in this area, you are not forced to test multiple antennas with different resonant frequencies.

TOP

BOTTOM

Material: The Slim Reach Xtend™ antenna is built on glass epoxy substrate.

APPLICATIONS

- Headsets
- Modules WiFi, Bluetooth, Zigbee...
- Sensors (data acquisition, etc...)
- RTLS (Real Time Location System)

BENEFITS

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

2. QUICK REFERENCE GUIDE

Technical Features	2.4 – 2.5 GHz
Average Efficiency	61.0 %
Peak Gain	1.1 dBi
VSWR	< 2:1
Radiation Pattern	Omnidirectional
Polarization	Linear
Weight (approx.)	0.02 g
Temperature	-40 to +125º C
Impedance	50 Ω
Dimensions (L x W x H)	7.0 mm x 3.0 mm x 0.9 mm

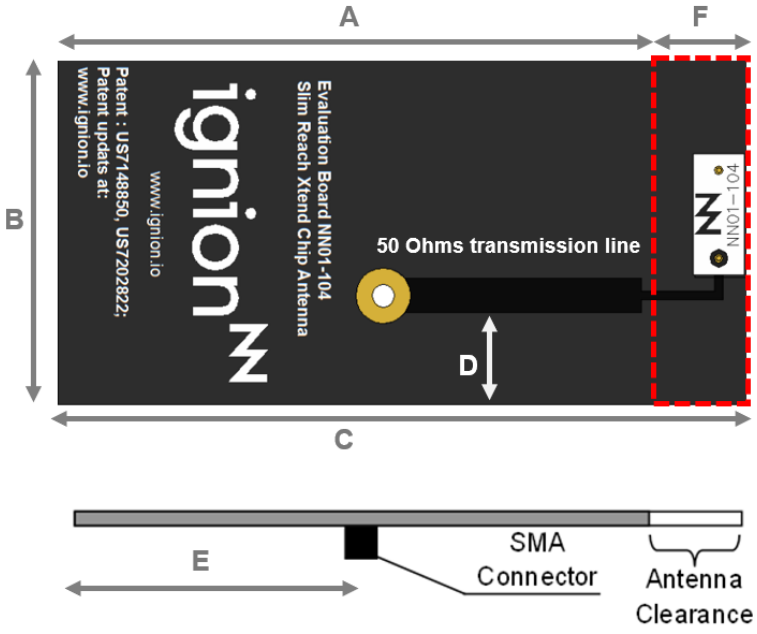
Table 1 – Technical Features. Measures from the evaluation board. See Figure 1.

Please contact support@ignion.io if you require additional information on antenna integration or optimization on your PCB.

3. ELECTRICAL PERFORMANCE

3.1. EVALUATION BOARD

The Ignion configuration used in testing the Slim Reach Xtend™ chip antenna is displayed in Figure 1.



Measure	mm
A	34.0
B	20.0
C	40.0
D	6.4
E	20.0
F	6.0

Tolerance: ±0.2mm

Material: The evaluation board is built on FR4 substrate. Thickness is 1.0mm.

Clearance Area: 20.0 mm x 6.0 mm (BxF)

Figure 1 – EB_NN01-104. Slim Reach Xtend™ Evaluation Board.

3.2. MATCHING NETWORK

The specs of a Ignion 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).

Please notice that different devices with different ground planes and different components nearby the Slim Reach Xtend™ chip antenna may need a different matching network. To ensure optimal results, the use of high Q and tight tolerance components is highly recommended (Murata components). If you need assistance to design your matching network, please contact support@ignion.io, or try our free-of-charge[1] **NN Wireless Fast-Track** design service, you will get your chip antenna design including a custom matching network for your device in 24h[1]. Other related to NN's range of R&D services is available at: https://www.ignion.io/rdservices/

[1] See terms and conditions for a free NN Wireless Fast-Track service in 24h at: https://www.ignion.io/fast-track-project/

3.3. VSWR AND EFFICIENCY

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

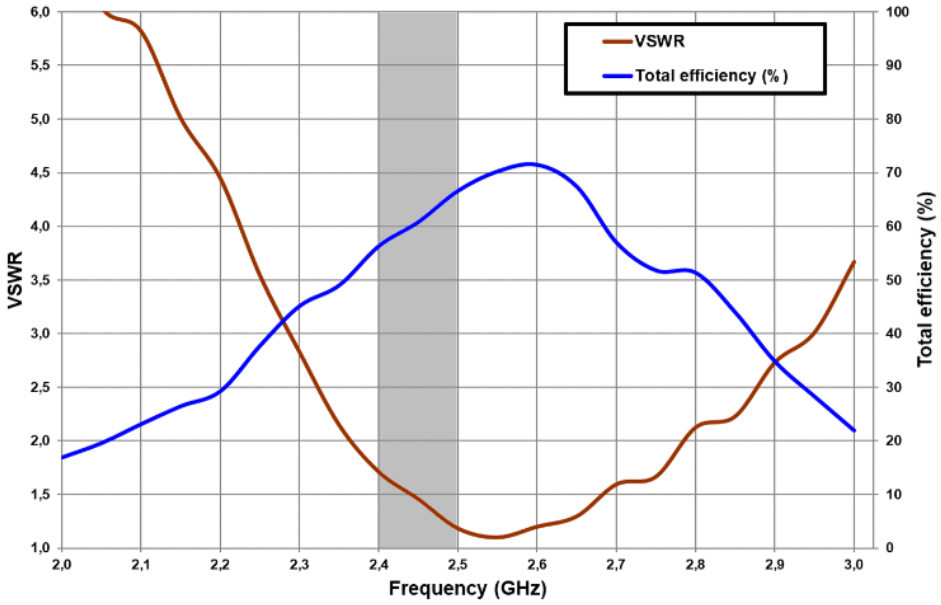
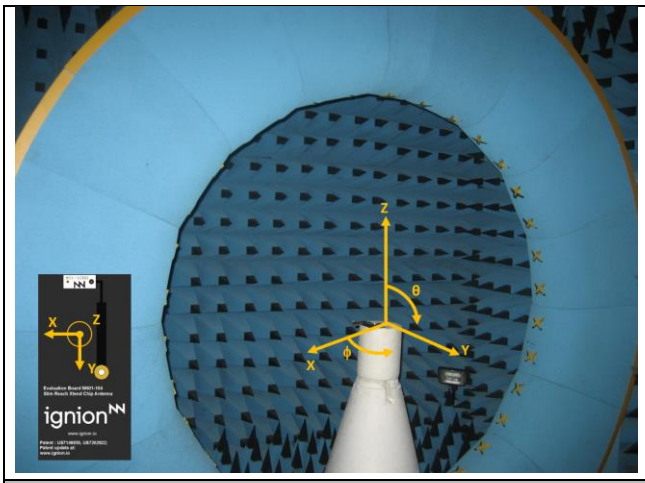


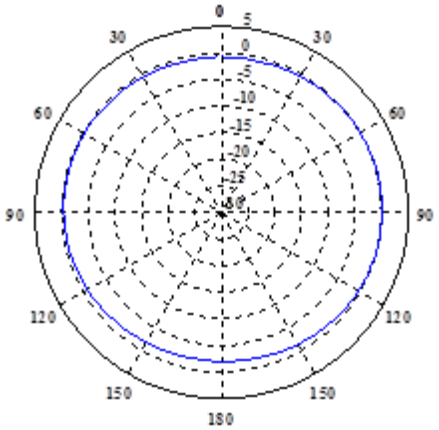
Figure 2 – VSWR and Efficiency (%) vs. Frequency (GHz).

NOTE: the frequency performance is centred in between 2.4 GHz and 2.5 GHz in headset designs. The effect of the device casing and the human body are taken into account.

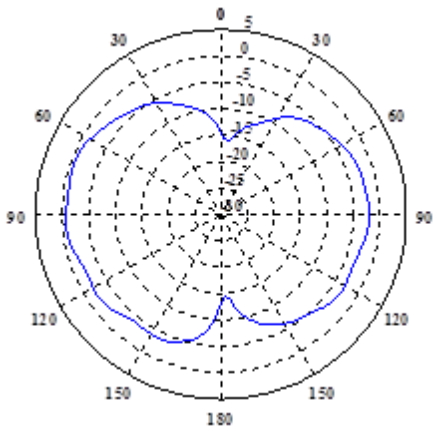
3.4. RADIATION PATTERNS (2.4 – 2.5 GHz), GAIN AND EFFICIENCY



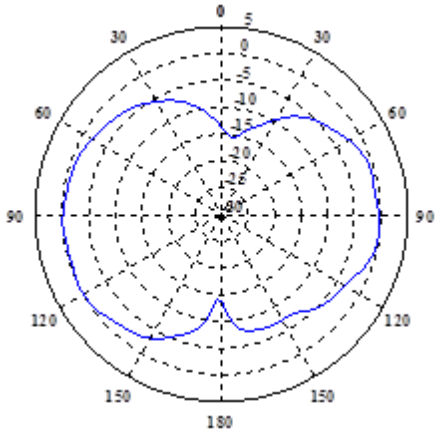
Orientation: Antenna in Plane ZY



Azimuth Cut θ = 90º Plane XY



Elevation Cut ϕ = 0 Plane XZ



Elevation Cut ϕ = 90 Plane YZ

Gain	**Peak Gain**	1.1 dBi
	Average Gain across the band	0.7 dBi
	Gain Range across the band (min, max)	0.4 **<–>** 1.1 dBi
Efficiency	**Peak Efficiency**	66.0 %
	Average Efficiency across the band	61.0 %
	Efficiency Range across the band (min, max)	57.0 – 66.0 %

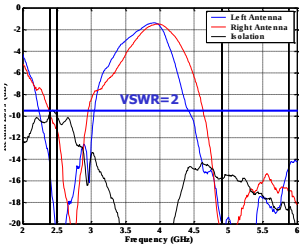
Table 2 – Antenna Gain and Efficiency within the 2.4 – 2.5 GHz band. Measures made in the evaluation board and in the Satimo STARGATE 32 anechoic chamber.

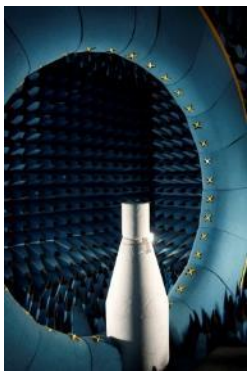
3.5. CAPABILITIES AND MEASUREMENT SYSTEMS

Ignion 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

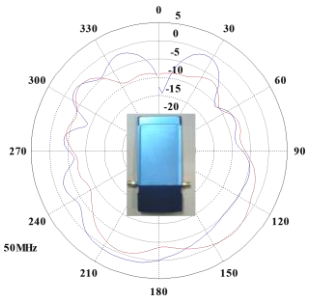
VSWR
&
S Parameters





SATIMO STARGATE 32

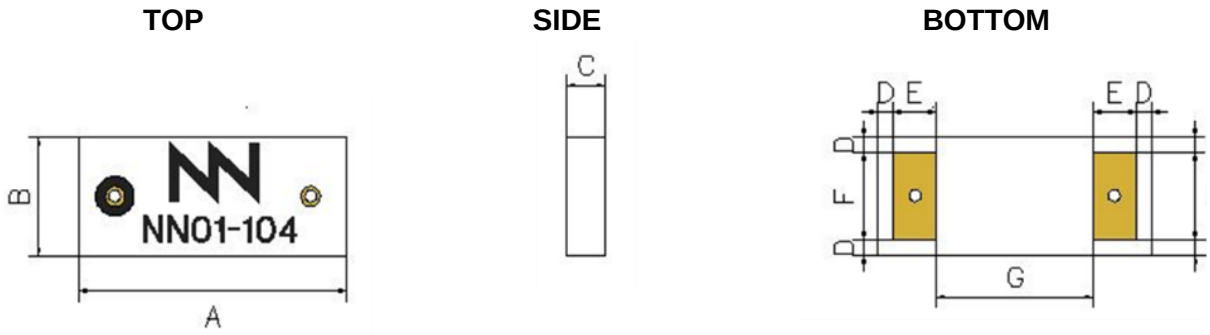
Radiation
Pattern
&
Efficiency



Anechoic chambers and full equipped in-house lab

4. MECHANICAL CHARACTERISTICS

4.1. DIMENSIONS AND TOLERANCES



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

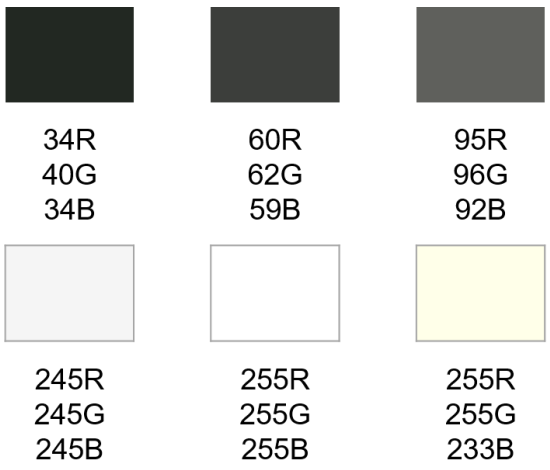
Measure	mm	Measure	mm
A	7.0 ± 0.2	**E**	1.1 ± 0.1
B	3.0 ± 0.2	**F**	2.2 ± 0.1
C	0.9 ± 0.2	**G**	4.0 ± 0.2
D	0.4 ± 0.15		

Figure 3 – Antenna Dimensions and Tolerances.

The Slim Reach Xtend™ chip antenna is compliant with the restriction of the use of hazardous substances (**RoHS**). The RoHS certificate can be downloaded from www.ignion.io.

4.2. SPECIFICATIONS FOR THE INK

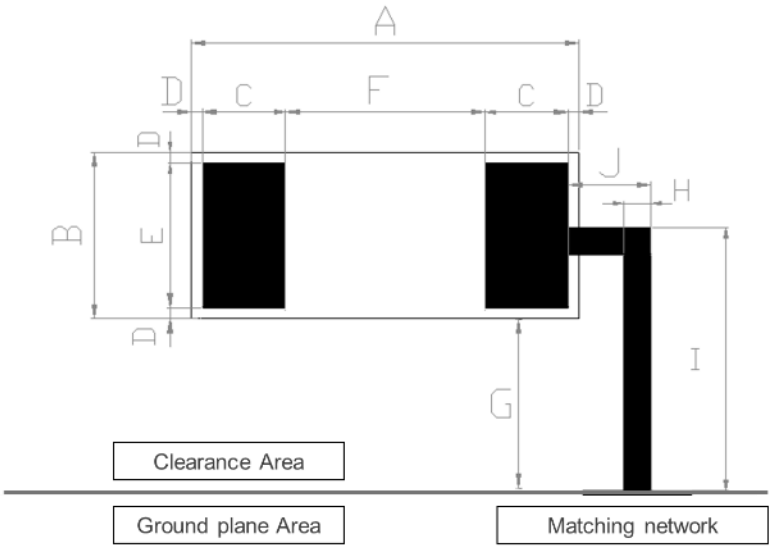
Next figure shows the correct colors of the antenna:



Acceptable color range

4.3. ANTENNA FOOTPRINT

This antenna footprint applies for the reference evaluation board described on page 6 of this User Manual. Feeding line dimensions over the clearance zone described in Figure 4 apply for a 1.0 mm thickness FR4 PCB.



Measure	mm
A	7.0
B	3.0
C	1.5
D	0.2
E	2.6
F	3.6
G	3.0
H	0.5
I	4.7
J	1.5

Tolerance: ±0.2mm

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 support@ignion.io.

5. ASSEMBLY PROCESS

Figure 5 shows the back and front view of the Slim Reach Xtend™ chip antenna, and indicates the location of the feeding point and the mounting pads:

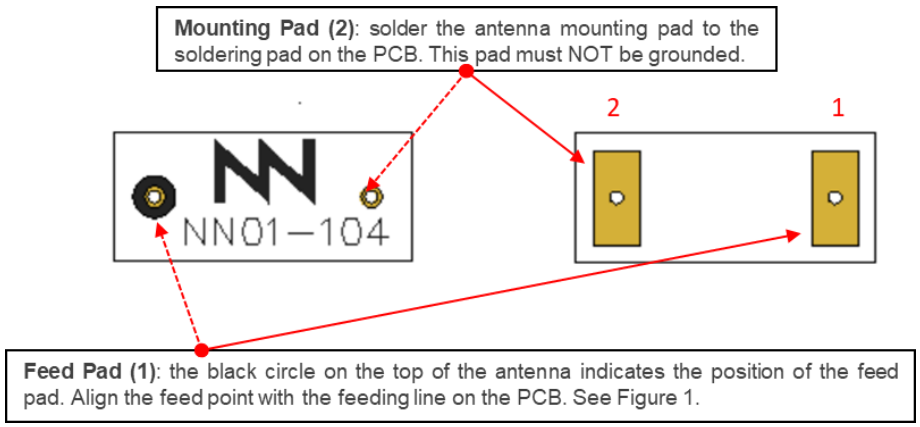


Figure 5 – Pads of the Slim Reach Xtend™ chip antenna.

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 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 13.
3. After soldering the antenna to the circuit board, perform a cleaning process to remove any residual flux. Ignion 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:

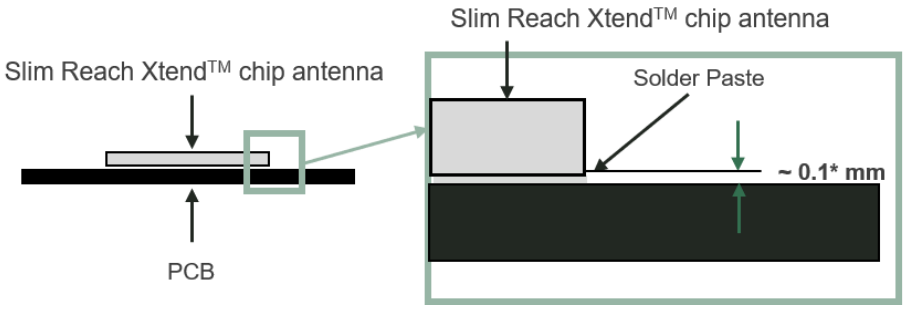


Figure 6 – Soldering Details.

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.

The Slim Reach Xtend™ 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.

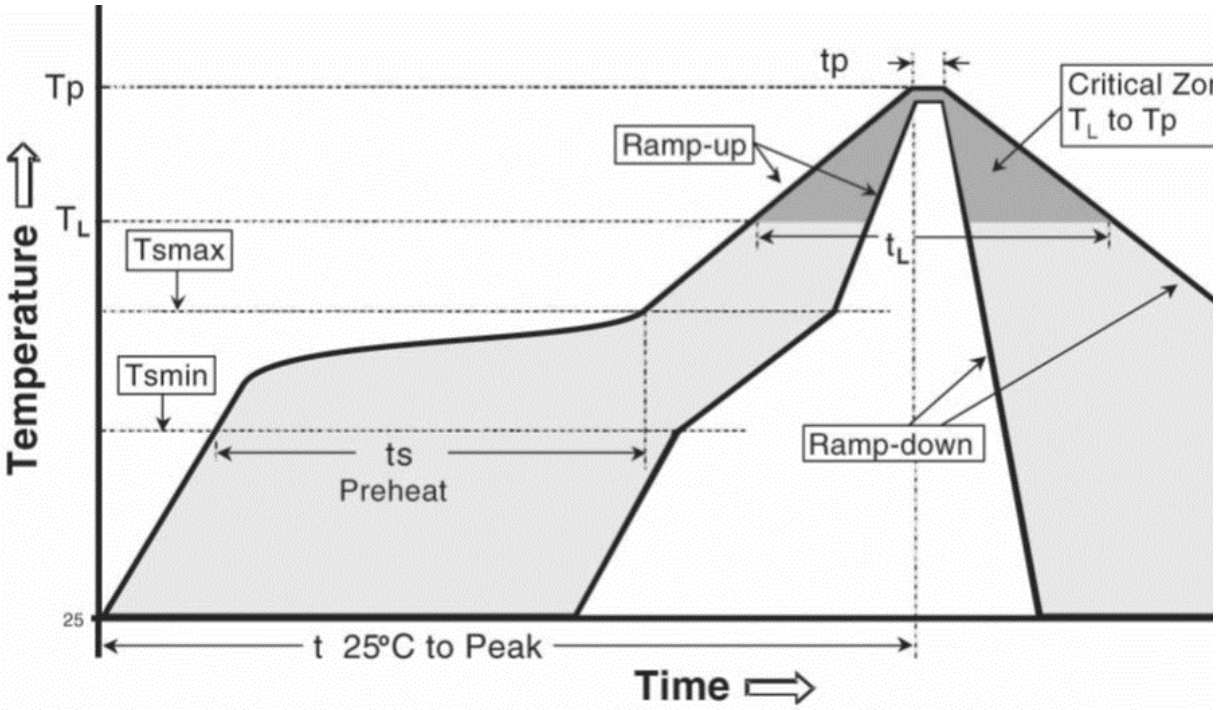
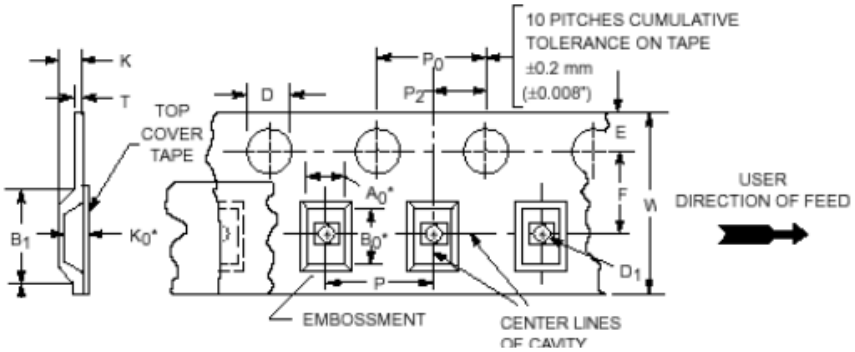


Figure 7 – Temperature profile.

6. PACKAGING

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



Measure	mm
W	16.0 ± 0.3
A0	3.4 ± 0.1
B0	7.4 ± 0.1
K0	1.2 ± 0.1
B1	8.0 ± 0.1
D	1.55 ± 0.05
D1	1.55 ± 0.05
Wmax	16.3
E	1.7 ± 0.1
F	7.5 ± 0.1
K	1.5 ± 0.1
P	8.0 ± 0.1
P0	4.0 ± 0.1
P2	2.0 ± 0.1

Figure 8 – Tape Dimensions and Tolerances.

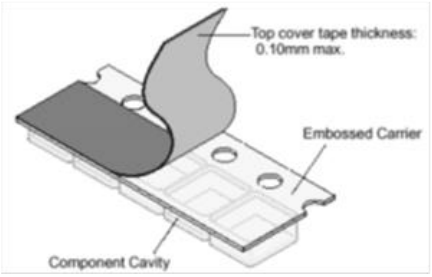
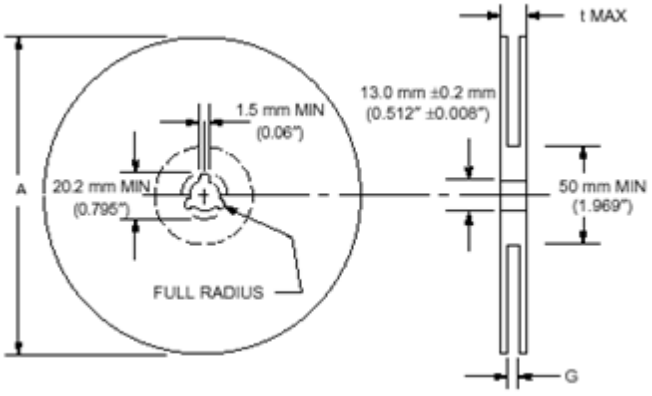


Figure 9 – Image of the tape.



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

Reel Capacity: 2500 antennas

Figure 10 – Reel Dimensions and Capacity.

7. PRODUCT CHANGE NOTIFICATION

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PCN Number: NN18090001

Notification Date: August 29th, 2019

Part Number identification:
Part Number changes, it will be applied in all the document of the company (User Manual, Data Sheet, …)

Previous Part Number	New Part Number
FR05-S1-N-0-104	NN01-104

Reason for Change:

	Specs (electrical/mechanical)		Manufacturing location
	User Manual/Data Sheet		Quality/Reliability
	Material/Composition		Logistics
	Processing/Manufacturing	X	Other: Logo, product color and Part Number

Change description
1.- Part Number: From FR05-S1-N-0-104 FRACTUS to NN01-104 IGNION in the User Manual
2.- Color: From blue/white to white/black

OLD

NEW

Comments:
1.- Electrical and Mechanical specs remain the same
2.- Footprint in the PCB to solder the chip antenna remains the same

Identification method
1.- The color and the logo are different

User Manual	X	Available from: January 2019
Samples	X	Available from: December 2019

Ignion Contact:

	Sales	Supply Chain
Name:	Josep Portabella	Albert Vidal
Email:	josep.portabella@ignion.io	albert.vidal@ignion.io