

# Airgain Embedded Antenna Product Datasheet

## Profile520B

Model N5x20B Series



Coverage. Performance. Smart.

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## Revision history

<b>Revision</b>	<b>Date</b>	<b>Note</b>
247-02-00-001-1 Rev A	March 14, 2012	Initial Draft
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## Disclaimers

The information in this document is provided in connection with Airgain Antenna products and is proprietary and confidential. Airgain may make changes at anytime without notice.

***Please verify with Airgain before finalizing a product design.***

## 1. Model N5x20B Embedded Antenna

Based on Airgain's patented technology, the Model N5x20B Embedded Antenna provides a high efficiency, 5GHz band embedded antenna solution for Wi-Fi and ISM band applications, such as WLAN products. As embedded antenna solutions become the focus of next generation wireless product design, the Model N5x20B provides the flexibility of an embedded antenna with top performance. The Model N5x20B Embedded Antenna has a smaller footprint than the model N5X20SC making it better suited for tight spaces. It is designed to accommodate most WLAN access point applications, such as routers and gateways and can be easily integrated into an ID package design.

## 2. Features

The Model N5x20B Embedded Antenna is defined by the following features:

- IEEE 802.11 a/n standards
- Single 5GHz Band operation
- Case mount
- 1.7 dBi peak gain @ 5.2 GHz
- High efficiency
- Quick integration



**Figure 1**

Model N5x20B-T Embedded Antenna with pre-applied mounting tape

### 3. Specification and Interface

<b>Standard</b>	IEEE 802.11n and 802.11 a
<b>Frequency Range</b>	4.9 to 5.9 GHz
<b>Peak Gain</b>	1.7 dbi @ 5.2 GHz
<b>VSWR</b>	2:1
<b>Feed Impedance</b>	50 Ohms
<b>Power Handling</b>	30 dBm
<b>Interface</b>	50 ohm, 1.13mm diameter, micro coax cable (available with optional U.FL compatible cable connector and/or cable mounted EMI ferrites)
<b>Antenna Dimensions</b>	17.5 x 9.8 x 0.8 (mm)
<b>Weight</b>	0.5 g (0.01 oz)
<b>Temperature Range</b>	Operating : -40° C to +75° C (-40° F to +167° F) Storage: -40° C to +85° C (-40° F to +185° F)
<b>Humidity Range</b>	0% to 95% non-condensing

### 4. Radiation Patterns

Radiation patterns for the Model N5x20B were taken with the antenna mounted on a 90mm by 90mm by 2.2mm thick, ABS plastic sheet using 1.6mm double sided tape.

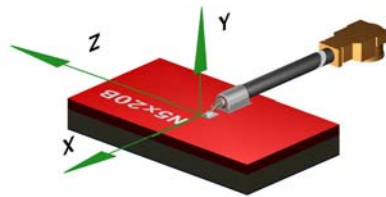


Figure 2

Model N5x20B Measurement axes

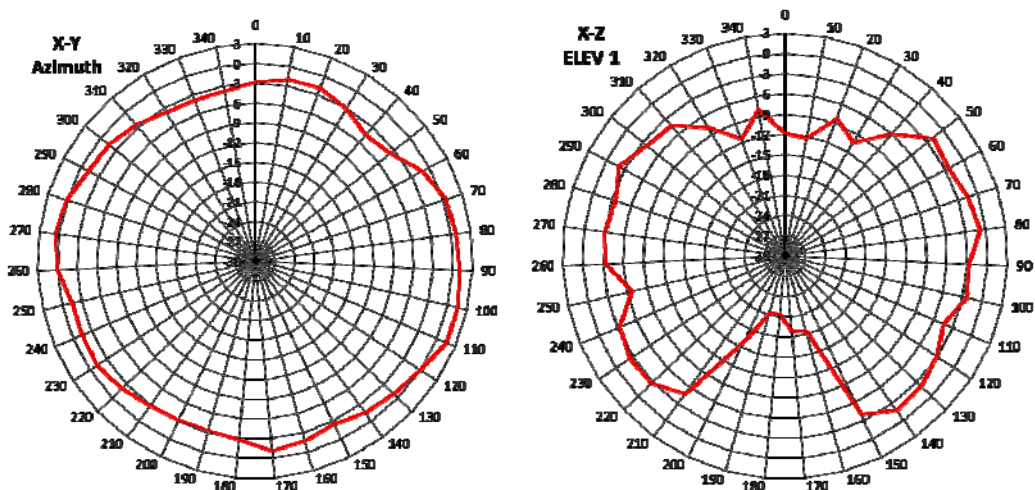
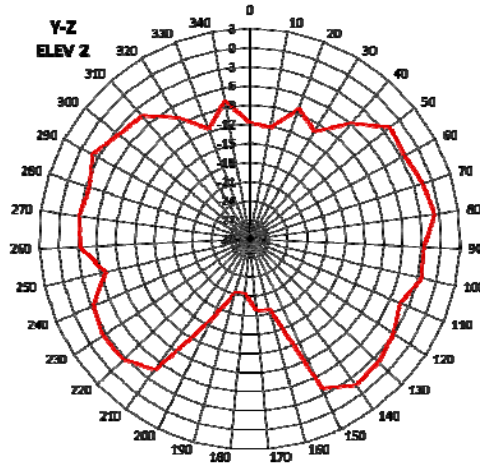


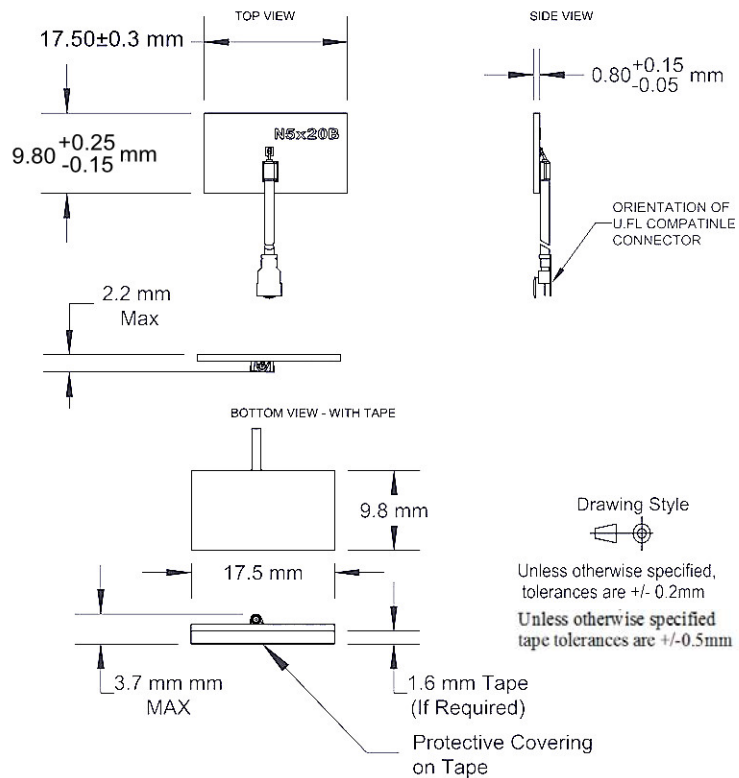
Figure 3a

Model N5x20B Measured Radiation Patterns at 5.2 GHz



**Figure 3b**  
Model N5x20B Measured Radiation Patterns at 5.2 GHz

## 5. Dimensions



**Figure 4**  
Model N5x20B Embedded Antenna Dimensions  
Model N5x20B-T Pre-applied Tape Dimensions

## 6. ROHS

Model N5x20B Embedded Antennas are RoHS compliant.

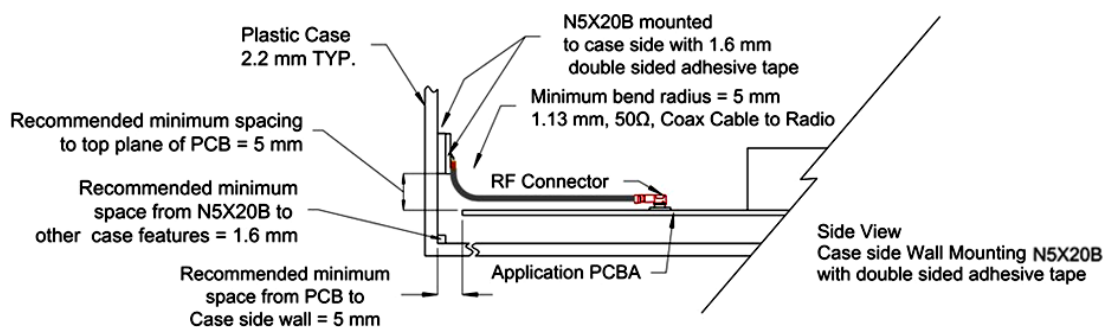
## 7. Mounting Guidelines

The model N5x20B embedded antenna can be simply mounted on the interior of an ABS Plastic case using double sided adhesive tape. This can simplify the industrial design process and can also shorten the product development cycle.

The N5x20B is mildly loaded (detuned) if it is not properly spaced away from the ABS Plastic mounting surface. Airgain recommends mounting the N5x20B antenna onto a 2.2mm thick ABS Plastic case with 1.6mm double sided tape for optimum performance. Mounting the N5x20B to case walls of different thicknesses may be considered, but optimum separation between the N5x20B and the case wall would need to be determined on a case by case basis. Airgain has observed that as the case material becomes thicker, the loading effect becomes more pronounced, which is offset by a larger air gap.

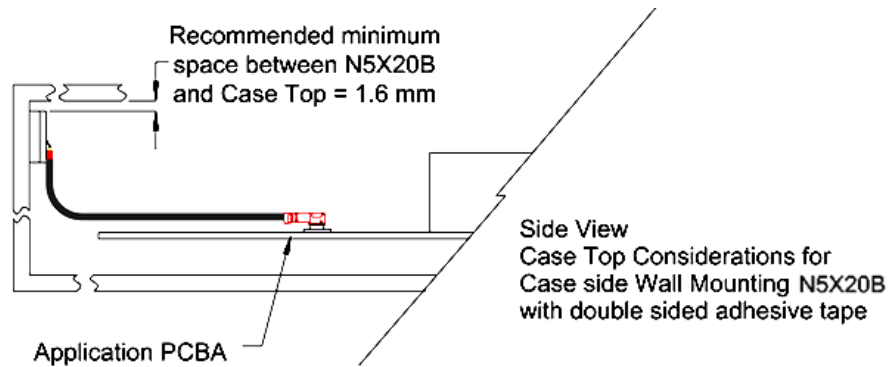
### Case Mounting the N5x20B using Double Sided Tape

For a case wall mount, the N5x20B can be mounted in an application case by using a 9.8 x 17.5 mm piece of double sided adhesive tape placed behind the antenna PCB, as shown in Figure 5a and Figure 5d. Place the N5x20B on the case side wall at a height where the lowest antenna PCB edge is 5 mm above the application PCBA top plane. A space of 5mm is recommended between the PCBA edge near the N5x20B and the case wall mounting location. (Figure 5a)



**Figure 5a**  
Side View of Case side wall mounting considerations for Model N5x20B

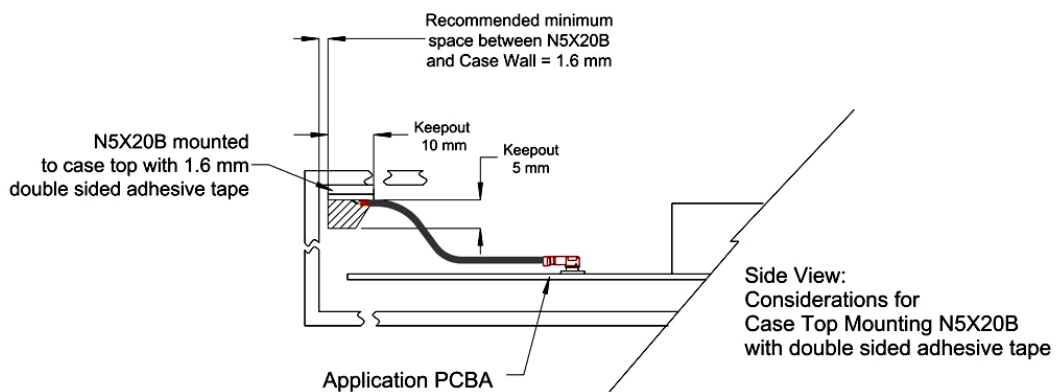
For a case top location, ensure that a space of 1.6 mm minimum is maintained between any other case walls, case features, or case top, which may be near the N5x20B antenna mounting location as shown in Figure 5b and Figure 5c.



**Figure 5b**

Case top considerations when mounting Model N5x20B on case side wall

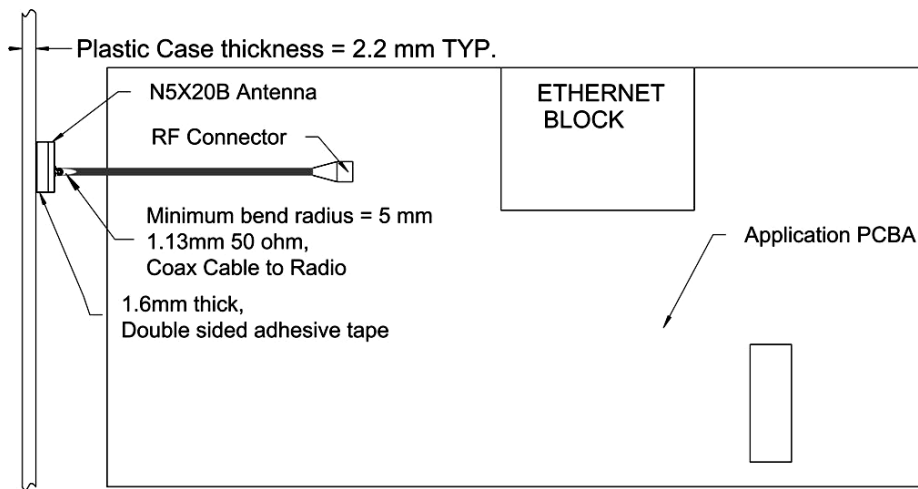
In Figure 5c, a tall component keepout area is defined beneath the N5x20B antenna. No portion of any tall components on the application PCBA should come within 5mm of the N5x20B. This helps assure maximum antenna performance.



**Figure 5c**

Side View: Clearance considerations when case top mounting Model N5x20B





TopView  
Case Side Wall Mounting N5X20B  
with double sided adhesive tape

**Figure 5d**

Top View: Case side wall mounting considerations when mounting Model N5x20B

## 8. Supporting Documents

The following design document(s) are used as references for design implementation of the Airgain Model N5x20B Embedded Antenna products:

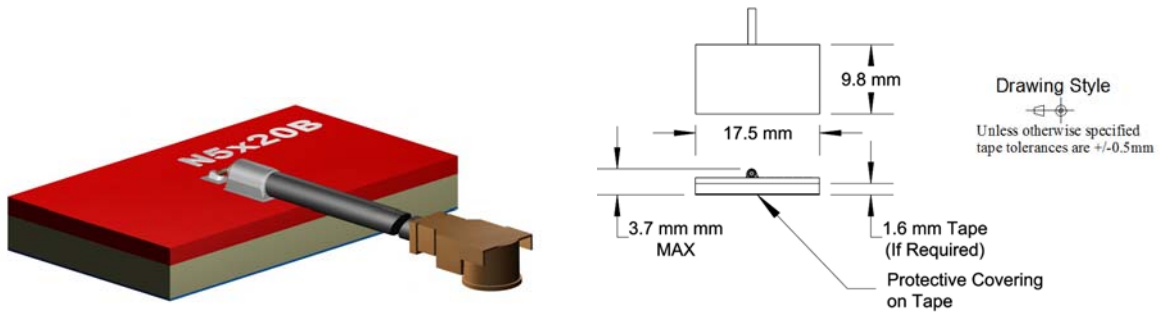
Assembly Drawing	247-07-00-001-3_A_ASSY.pdf
Cable Datasheet	000-22-00-006-1E RF Cable Datasheet.pdf

## 9. Feature and Options Information

Airgain Model N5x20B Series antennas are equipped with a RF cable I/O interface. Optional cable termination such as U.FL compatible micro coax connectors and cable mounted EMI ferrite cores are available. To aid mounting the N5x20B, pre-applied double sided adhesive tape is available on the N5x20B -T Series.

## 9.1. Pre-applied Mounting Tape Information

Airgain Model N5x20B-T Series antennas are supplied with pre-applied double sided adhesive tape. This mounting method has been tested and verified at Airgain Inc. to provide a RF interference-free attachment technique. A -T- suffix specifies tape, typically 1.6 mm thick, applied for mounting in desired orientations as described in Section 7 and shown in **Fig. 6** below



**Figure 6**

N5x20B-T-GXXXU with one piece of 1.6mm tape on bottom surface

## 9.2. Part Number Information

Airgain uses a multi-staged standard number system for our part numbers, which serially define the antenna type, cable length and connector type/interface, as detailed below:

Antenna #	Tape Type -XX (if required)	Cable Type -X	Cable Length -XXX	Connector Type -XX (if required)
N5x20B	Blank = No Tape T = Tape on bottom element	G = Grey (Standard) B = Black (Non Standard) W= White (Non Standard)	Cable length in millimeters (mm) Sample Lengths*: 65, 100, 130, 150, 190, 230, 250, 300,400	Blank = Stripped Cable U = U.FL connector C = U.FL connector plus Ferrite Core CS = stripped cable plus Ferrite Core CL = U.FL connector plus Large Ferrite Core Ferrite Core size: C/CS:3.5mm * 9.0mm * 1.5mm (Standard) CL:8.0mm * 4.0mm * 4.0mm (Non Standard)

\* Standard Cable Lengths listed in RF Cable Datasheet

*Example part number:*

**N5x20B-T-G100U** – N5x20B antenna with 1.6mm double-sided adhesive tape with 100mm cable plus U.FL connector.

