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LTE Series
N703LTSTM

Preliminary

Airgain Embedded Antenna

Preliminary

Engineering Data Sheet

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Revision History (Required)

Revision	Date	Note
326-00-00-001-1- Rev1.0	January 16, 2014	Preliminary Datasheet 1.0

Disclaimers

The information in this document is provided in connection with Airgain Antenna products and is proprietary and confidential. Airgain may make changes at any time, without notice.
Please verify with Airgain before finalizing a product design.

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1. Airgain N703LTSTM Embedded Multiband LTE Antenna

Based on Airgain's patented technology, the Model N703LTSTM Embedded multiband LTE Antenna provides a wide band and high efficiency, embedded antenna solution for low power applications in the LTE bands. As efficient, embedded antenna solutions become the focus of next generation wireless product design, the Model N703LTSTM antenna provides the combination of low cost and small size with top performance. The antenna was designed to accommodate wireless communication device applications, such as AP/Router, Cellular Phone, Tablet computer and etc. The N703LTSTM is optimized for SMT mounting on a printed circuit board utilizing a micro strip-line RF interface. It is easily integrated into a PCB design.

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2. Features

The N703LTSTM Embedded LTE Antenna is defined by the following features:

- LTE bands (698-960MHz, 1710-2170MHz, 2300-2690MHz)
- Optimized for PCB SMT mounting in applications
- PCB Micro-strip line RF interface
- Low Profile, 0.8 mm high
- Peak gain +2.4dBi@750MHz, +4.0dBi@1940MHz, +4.2dBi@ 2690MHz
- High efficiency (>45% for 698-960MHz, >60% for 1710-2170MHz and 2300-2690MHz)
- Quick integration

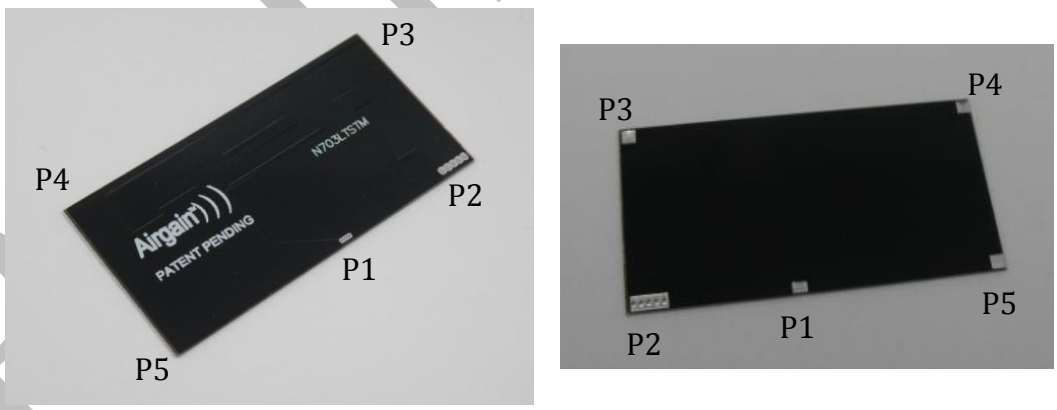


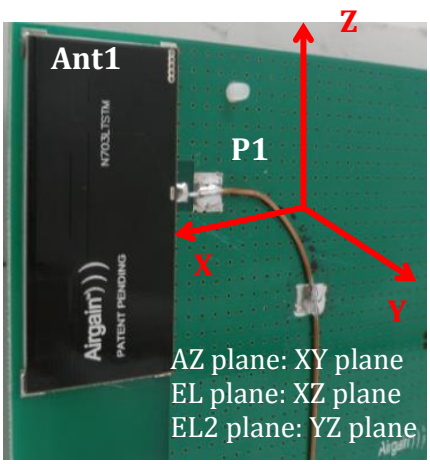
Figure 1 Airgain N703LTSTM embedded surface-mount LTE antenna
P1: Feed-pin. P2: GND-pin, P3-P5: Soldering pins

3. Specifications and Interface

Standard	LTE
Frequency range	698-960MHz, 1710-2170MHz, 2300-2690MHz
Peak gain	+2.4dBi @750MHz, +4.0dBi@1940MHz, +4.2dBi @ 2690 MHz
Efficiency	>45% for 698-960MHz, >60% for 1710-2170MHz and 2300-2690MHz
VSWR	Better than 3:1 for 698-960MHz, better than 2:1 for 1710-2690MHz
Feed impedance	50 ohms
Power handling	30dBm
Interface	Pin 1: Feed-pin, 50 ohm, connect to 50 Ohm micro-strip line on PCB; Pin 2: GND-pin; Pin3 to Pin 5: Soldering pins for mounting stability
Antenna dimensions	50.6 x 26.6 x 0.8mm
Weight	3g
Temperature range	Operating: -40° C to +75° C (-40° F to +167° F) Storage: -40° C to +85° C (-40° F to +185° F)
Humidity range	0% to 95% non-condensing

4. Radiation Patterns

Radiation patterns for the Airgain N703LTSTM were taken with the antenna mounted on a 180 x 130 x 1.6mm thick 2-layer FR4 PCB (1 oz copper).



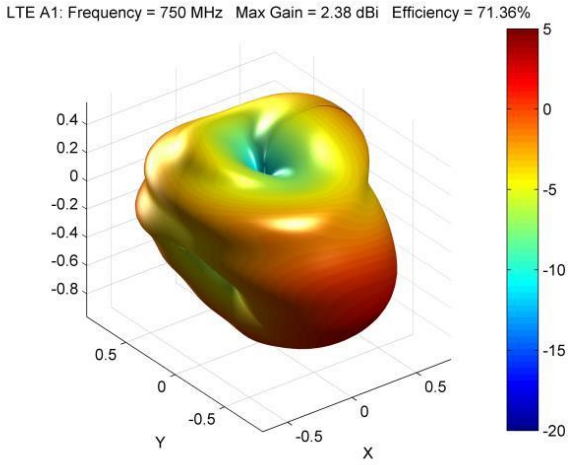
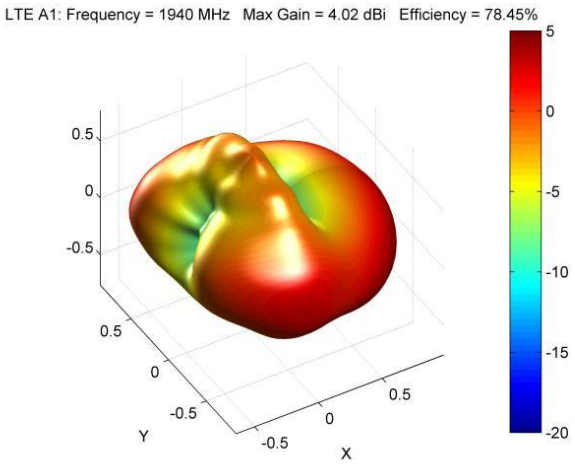
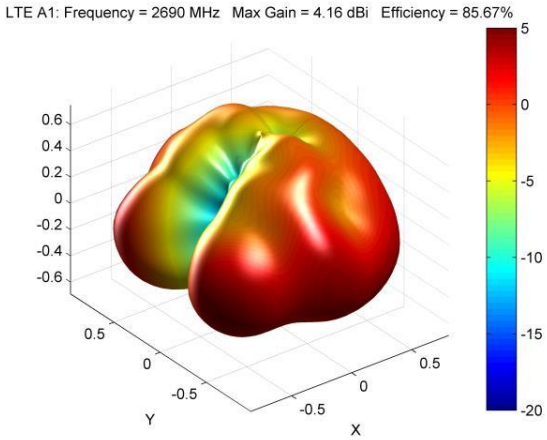


Figure 2 N703LTSTM antenna test coordinate system (a) F=750MHz





(b) F=1940MHz (c) F=2690MHz

Figure 3 Airgain N703LTSTM antenna radiation patterns

5. Antenna Footprint and Dimensions

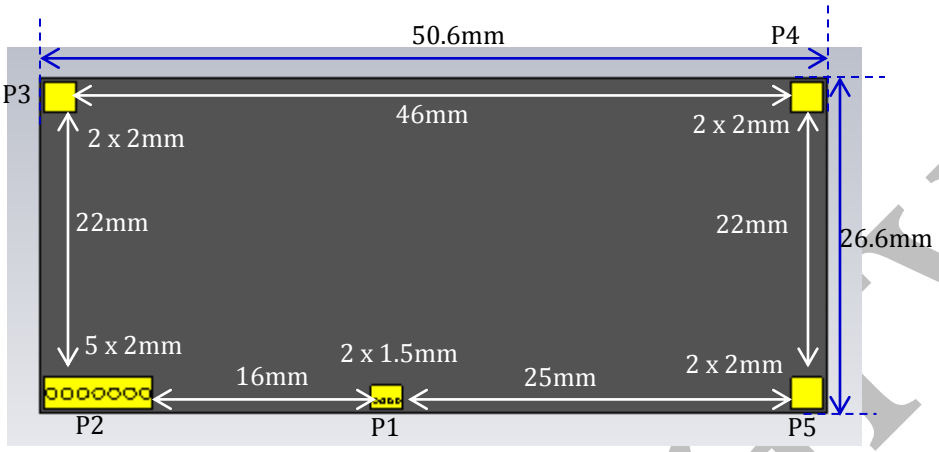


Figure 4 Airgain N703LTSTM antenna footprint and dimensions

6. ROHS

Airgain N703LTSTM embedded LTE antenna is RoHS compliant.

7. Mounting Guidelines

The Model N703LTSTM surface mounted LTE antenna incorporates a stable support footprint using SMT pin Connections, simplifying use in new PCB designs. Airgain has developed guidelines that should be followed to achieve the best performance from the Model N703LTSTM.

Figure 5 shows the N703LTSTM LTE antenna mounted on a PCB. For best performance, Airgain suggests to place the N703LTSTM at right top corner of PCB and keep 17 mm away from the edge of the PCB. Performance tests have had the N703LTSTM mounted onto a 2- layer FR4 PCB with dimension of 180 x 130 x 1.6mm.

Pin 1 is designed to be 50 ohms, and fed by a 50 ohm micro-strip line as shown in Figure 5. Pin 2 must be a direct connection to RF ground. Pin 3 to Pin 5 are provided for mechanical stability, and they should be soldered to pads on circuit PCB.

In Figure 5, the RF feed trace is leaving Pin 1, at a right angle to the N703LTSTM, to help avoid unintended interference between the element and the RF transmission line. Airgain recommends this signal path for either Top Layer routing, or Bottom layer routing of the RF transmission line. RF signal routing on an internal layer has not been tested, and is not recommended.

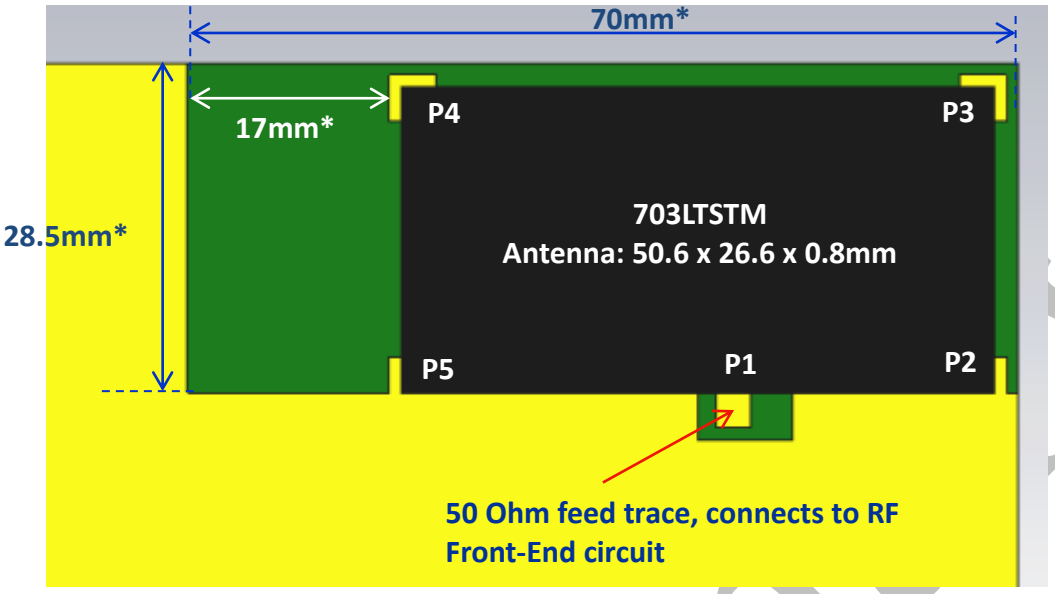


Figure 5 Airgain N703LTSTM LTE antenna mounted on PCB

Figure 6 shows the circuit PCB layout details and important mounting constraints for the application of the N703LTSTM multi-band LTE antenna. A space of 70 x 28.5mm must be left for the antenna placement and there are no any metal layers inside and beneath the substrate of this region.

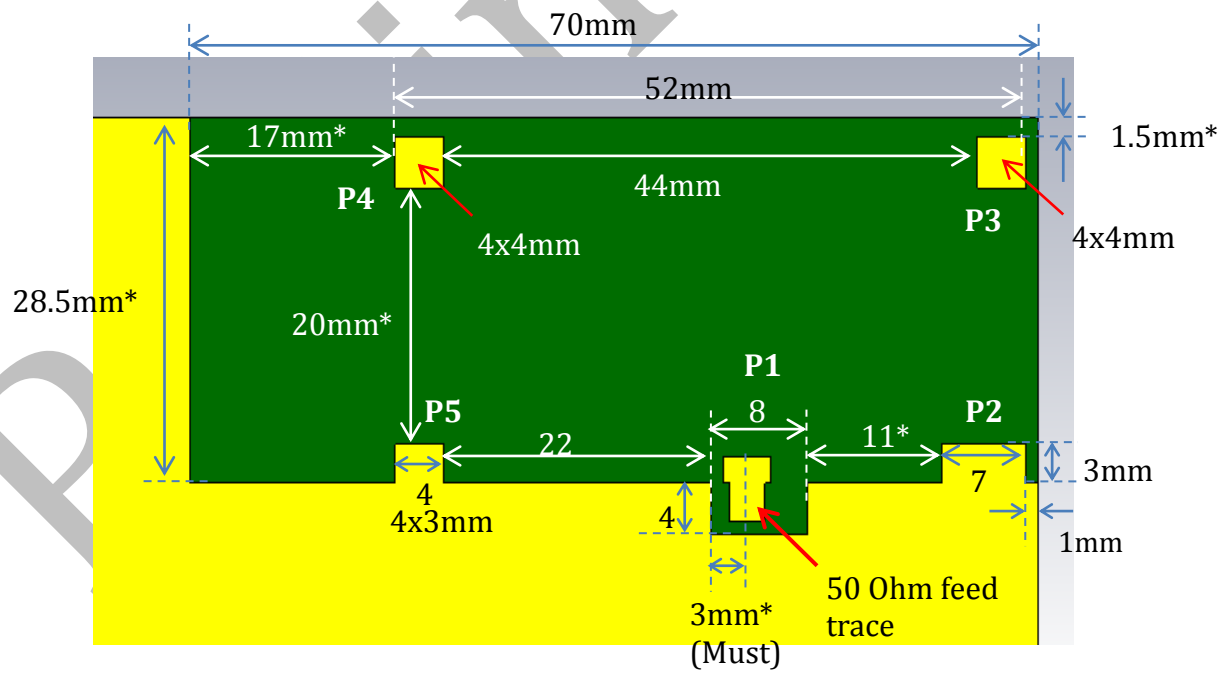


Figure 6 Airgain N703LTSTM antenna PCB layout requirements

The detail layout requirement for feed trace is shown in Figure 7. The feed trace contains a 4 x 2mm pads section for antenna feed pin soldering, a 3mm long 50 Ohm micro-strip line trace. The distance between the center of 50 Ohm trace and PCB edge must maintain as 3mm.

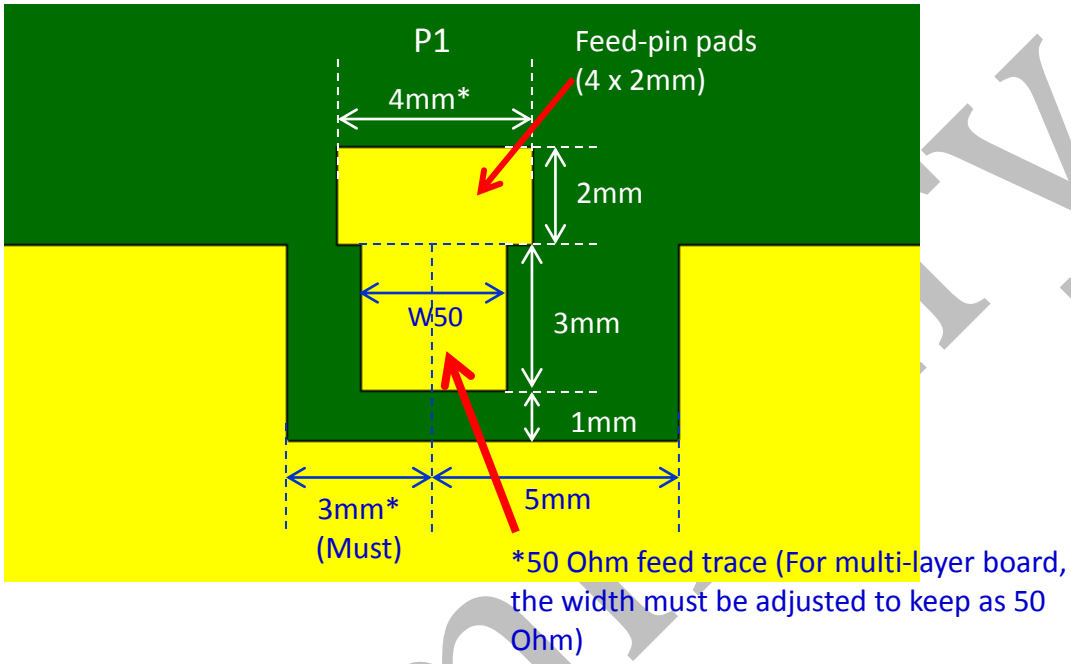


Figure 7 Airgain N703LTSTM antenna feed trace layout requirement

Some important notes to remember:

- Place antenna at circuit PCB right top corner, and a 70 x 28.5mm space must be left for antenna placement. In this region, there is not any metal layer inside and beneath the substrate layer (substrate layer only) and there is no any circuit component underneath this antenna region. See Fig. 6.
- The distance from the antenna left edge of soldering pads to the PCB edge must maintain 17mm. See Fig. 5 and Fig. 6.
- The input feed trace must maintain 50 Ohm. See Fig. 7
- The distance from center of fee trace to PCB edge must maintain 3mm, see Fig. 7

For multilayer PCB board, such as the PCB layer stack-up example shown in Figure 8, the width of feeding trace must be adjusted to maintain as a 50 Ohm trace for best performance. In Figure 8, assume the antenna is put at top layer of PCB, and then substrate thickness of 7mils must be used to calculate the width of the 50 Ohm feed trace. However, to avoid the width of 50 Ohm trace is too narrow, top dielectric layer substrate thickness should be appropriately selected (for example, 10 mils thickness is better than 7 mils thickness).

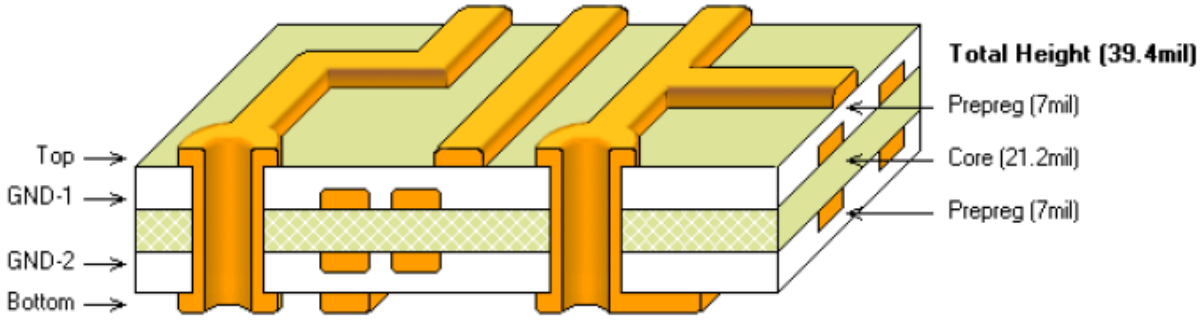


Figure 8 PCB layer stack-up for multi-layer board (Example)

8. Supporting Document

Contact your Airgain representative for more information.