

# Micro coil NFC antennas

Micro coil NFC antennas eliminate major considerations for NFC antennas – size, placement, layout and RF performance. They have more benefits compared to planar NFC antennas; mainly while used in specific applications. Logomotion’s micro coil NFC antennas are off-the-shelf products. In addition to standard portfolio, customized design can be prepared on request.

## Antenna Design

Micro coil NFC antenna is a solenoid type of antenna with a small size ferrite core wound with multiple wires. **The basic product has sizes L: 9 mm x W: 0,93 mm x T: 0,785 mm. Samples from automated production are available.** Other sizes of piece produced samples in limited volumes are available for testing (L x W x T):

- \* 28 x 1,73 x 0,785 mm
- \* 23 x 1,73 x 0,785 mm
- \* 18 x 1,73 x 0,785 mm
- \* **9 x 0,93 x 0,785 mm**



The antennas are designed by Logomotion and produced in EU. Automated production of customized sizes of the coil antennas can be discussed for volume orders.

## Performance Characteristics

### Electrical Features

Electrical features of the micro coil antennas were measured in open air and in metal environment (50 x 30 mm Cu plate placed at the distance of 1 mm above the antenna).

For ALM the inductance of the antenna was measured in pulse mode which corresponds to applications using the antennas in ALM. We specified overall rms value of the current flowing through the antenna during the measurement ("mA rms").

Antenna Coil Part Number	Antenna Dimensions (L x W x T)	ALM - Nominal Inductance Current 100mA rms		Rated current		Q - quality@13.56MHz Current 100mA rms	Self-resonance min.
		Open Air	Metal environment	Continuous current	Up to 1s		
9mm A.6.20	9 x 0,93 x 0,785	1.25 uH	1.2 uH	100mA rms	250mA rms	15	100 MHz
18mm B.9.21	18 x 1,73 x 0,785	1.26 uH	1.15 uH				
23mm B.9.23	23 x 1,73 x 0,785	1.4 uH	1.29 uH				
28mm B.9.25	28 x 1,73 x 0,785	1.47 uH	1.36 uH				

In PLM, 9mm coil antenna has inductance value 1.2  $\mu\text{H}$  (@13.56 MHz).

### Inductance Tolerances

The standard inductance tolerance in automated production is  $\pm 5\%$ . On request, we can offer smaller inductance tolerance. For the samples, the tolerance is not guaranteed.

### Influence of Metal

Coil antennas have stable performance in metal environment. From a distance of approximately 3 mm between the metal plate and the antenna, the influence of the metal on the antenna inductance is negligible. Properly designed metal housing can even increase antenna performance.

### Supported standards

- \* ISO/IEC 14443 Type A, B, F (up to 848 kbps) with ALM
- \* Supports both ALM and PLM
- \* EMVCo NFC CE
- \* RoHS

## NFC performance

### Communication distance with 9mm coil antenna

- \* In PLM – 25 mm  
[9mm coil antenna connected to NXP tag ICODE SL2S2002, read by HTC U11]
- \* In ALM – 59 mm in open air / 35 mm in metal housing  
[9mm coil antenna connected to NXP NFC controller SN100T, read by Sony RC-S380]

### Load modulation amplitude with 9mm coil antenna

- \* LMA\_000 – 42 mV  
[9mm coil antenna connected to NXP NFC controller SN100T, measured on FIME EMVCo analog test bench]

## Assembling

Micro coil NFC antenna is SMD component, delivered in reels. Having electrodes at both ends it is capable of reflow soldering and surface mounting, and thus requires no additional pin connectors.

## Applications

- \* tiny devices – under skin glass tubes, human and animal implants, bracelets, glasses, earphones (NFC tag, pairing, secure access, flash memory locking)
- \* metal housing objects and complicated electronic environments (ALM and PLM)
- \* micro paying wearables – rings, watches, key fobs, microSD cards (EMVCo CE mode)

## Development Areas

We can help you with selection of the micro coil, customized antenna design, tuning for a particular NFC chip (NFC controller, NFC tag) for NFC products with sensors or secure chips.