

Miniature coil NFC antenna systems

Miniature coil NFC antennas are off-the-shelf antennas that eliminate major considerations for NFC antennas - placement, layout and RF performance. Miniature coil NFC antenna has a ferrite core wound with multiple wires that have more benefits compared to planar NFC antennas.

Development Areas

NFC antenna design

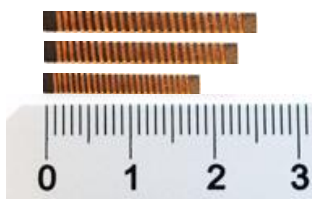
We will help you with selection of miniature NFC coil antenna design, tuning with a particular NFC controller and SE. We recommend to use miniature NFC coil antennas in one of two basic designs:

- * A single antenna design uses one coil antenna for both RX (receiving) and TX (transmitting). Choose the size from our portfolio
- * Dual antennas design uses one coil as RX antenna and the second coil as TX antenna (to improve the isolation). For NFC controllers with very low isolation or to reach a specific criterion the coil used as TX antenna can be substitute by a miniature planar antenna.

We have developed various combinations of miniature coil NFC antenna modules. These NFC modules passed EMVCo (CE), MoNA and NFC Forum Power transfer (R/W) criteria in various environments - plastic, glass and metal.

Miniature NFC coil antennas – basic portfolio (L x W x T)

- * 18 x 1.385 x 3.14 mm
- * 23 x 1.185 x 3.14 mm
- * 25 x 1.685 x 3.14 mm
- * 9 x 0,93 x 0,785 mm
- * 18 x 1,73 x 0,785 mm
- * 23 x 1,73 x 0,785 mm
- * 28 x 1,73 x 0,785 mm



Performance Characteristics

Supported standards

- * ISO/IEC 14443 Type A, B, F (up to 848 kbit/s) with Active Load Modulation (ALM)
- * Supports both ALM and PLM
- * EMVCO NFC CE and Mobile NFC Association MoNA
- * Compliant with NFC antenna performance requirements (RW mode) for India:
Power transfer at 0 and 1 cm in a position A - must pass both distances and in the

rest of positions - B0, C0, D0 and E0 it must pass 2 out of 4 distances including card operation distance for DESFire EV2 tag - 18mm

- * RoHS

Influence of Metal

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

Electrical Features

Electrical features of miniature coil antenna systems were measured on LGM antenna measurement system

Antenna Coil Part Number	Nominal Inductance - Current 100mArms		Rated current		Q- quality@13.56 MHz Current 100mArms	Self- resonance min.
	Open Air	Metal environment	Continuous current	Up to 1s		
9mm A.6.21	1.25 uH	1.2 uH	100mArms	250mArms	15	100 MHz
9mm B.5.21	1.23 uH	1.15 uH			15	
18mm B.9.21	1.26 uH	1.15 uH			23	
23mm B.9.23	1.4 uH	1.29 uH			23	
28mm B.9.25	1.47 uH	1.36 uH			23	

Assembling

Miniature coil NFC antenna is SMT component. Having electrodes at both ends it is capable of reflow soldering and surface mounting, and thus requires no additional pin connectors. Coil antenna can be picked from a tape and directly placed on PCB.

Applications

- * smartphones and feature phones (CE and R/W modes)
- * secure microSD cards (CE mode) and SD cards (CE and R/W mode) – for payments, pairing, flash memory locking
- * miniature paying wearables – rings, watches, key fobs (CE mode)
- * tiny devices with size limits to place standard NFC planar antenna - bracelets, glasses, earphones, speakers (pairing, secure access)
- * in any metal housing objects and complicated electronic environments; primarily used for Active Load Modulation (ALM), yet it can be also used for PLM