

# Miniature coil NFC antenna

## Added Values

**This off-the-shelf NFC antenna eliminates major considerations for NFC antennas - placement, layout and RF performance. It would not limit shape of your products. It would save effort required for antenna design and individual model modifications. It occupies in average 80% less space than NFC planar antennas and still it offers great multidirectional NFC performance. It reduces BOM, simplifies antenna tuning under the cover and lowers assembly costs.**

### Basic description

The miniature coil NFC antenna has a ferrite core wound with multiple wires. It is available in various sizes, starting from (L x W x T): 9mm x 0,93mm x 0,785mm.

There are various coil antenna designs using a single coil or dual coils and that pass EMVCo NFC CE mode and NFC Forum R/W mode criteria in various casings - plastic, glass and metal.

### Size performance ratio

As a result of the technology one 9mm ferrite coil NFC antenna meets EMVCo NFC CE mode criteria even under metal covering. Achieving satisfactory NFC performance in smartphones (CE and R/W modes) the coil antennas would save approximately 80% from the area of conventional NFC antennas with comparable performance.

### Simplified design work

The coil antennas are tiny and it is not necessary to adjust the arrangement of metallic components near to them. Two coils - when one working as TX antenna and the second as RX antenna - can improve RX/TX isolation. Coil antennas are not much sensitive to the product's casing. Coil antennas would limit steps needed to achieve matched and tuned NFC system and save effort for individual model modifications.

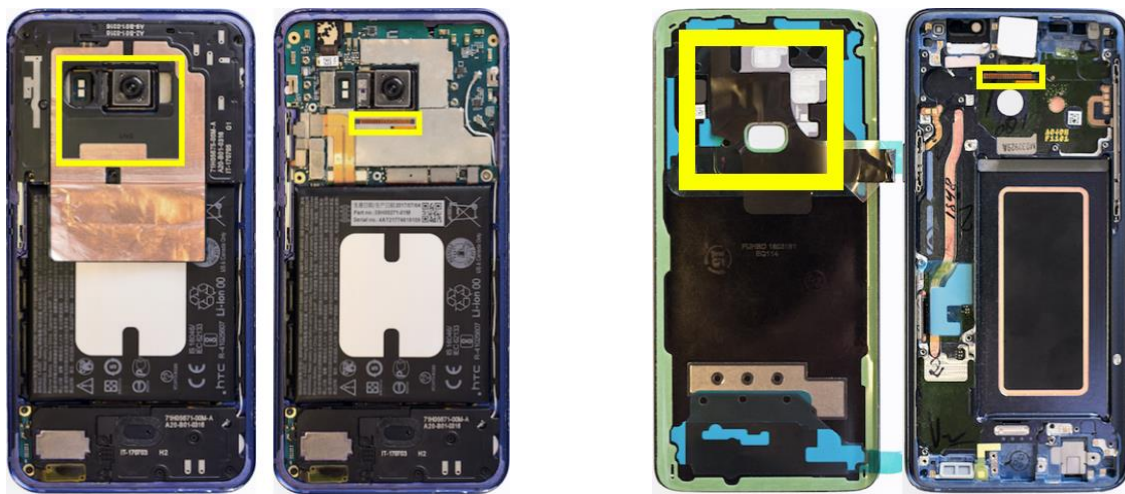
### BOM and assembly costs reduction

Unlike with planar NFC antennas ground plane and ferrite shielding are not needed. Coil antenna has electrodes at both ends, is capable of reflow soldering and surface mounting, and thus requires no additional connectors. Coil antenna can be picked from a tape & reel and directly placed on PCB. This makes assembly costs and effort lower compared to NFC antennas that are using external connectors or 3D structures.

## Typical 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, transit, pairing, flash memory locking
- \* miniature paying wearables – rings, watches, key fobs (CE mode)
- \* tiny devices with size limitations 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

## Size and occupied space area - examples



**HTC U11** – Placement of original antenna (left) and miniature coils 9mm+18mm (right)

**Galaxy S9** – Placement of original antenna (left) and miniature coils 9mm+18mm (right)

## Benefits of the Miniature coil NFC antennas

NFC antennas – CE and R/W modes (example for smartphones)	Planar antennas	Miniature coil antennas
Size – area	400mm <sup>2</sup>	80mm <sup>2</sup>
Omni-directional performance	No	Yes
Functionality in metal environment	No	Yes
NFC product design complexity	High	Low
Tuning under cover complexity	High	Lower
BOM – ground plane, ferrite shielding	Yes	No
BOM assembly costs	High	Lower