Withings NFC Antenna
WFA02 Specification

Subject	Withings WPA02 NFC Antenna WFA02
Type	Specification
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Diffusion	Withings, Manufacturing Subcontractor, Certification Lab

I   Revision History

v01
- Initial version

II Purpose

This document describes the design and gain characteristics of the Withings WFA02 NFC antenna designed by Withings.

III Confidentiality

The mechanical and electrical information contained in this document may be made public for purposes of certification.

IV Features

- 13.56MHz
- 16,5mm x 30.5mm
- Highly integrated antenna on PCB
- Low-range NFC communication
- Compact conception for high integrability

V   General Description

This compact NFC coil antenna has been designed ad-hoc for high integrability in a compact NFC reader circuit requiring low-range communication (few centimeters). It is directly integrated into the NFC PCB circuit. This design was created by Withings and can be easily incorporated into various products.

Type	Brand	Manufacturer	Model	Connector
PCB	Withings	Withings	WFA02	N/A

VI Coil Electrical Characteristics

Material	Copper 35 µm
Inductance (Ls)	780nH
Resistance (Rs)	880mΩ

VII Coil Mechanical Characteristics

Thickness	0.6mm
Width	30.5mm
Height	16.5mm

The following figure shows the design of the NFC antenna which is directly integrated onto the PCB (blue trace, on layer 3 of a 4-layer PCB, 0.6mm thickness).

Figure 1: FPC layout design
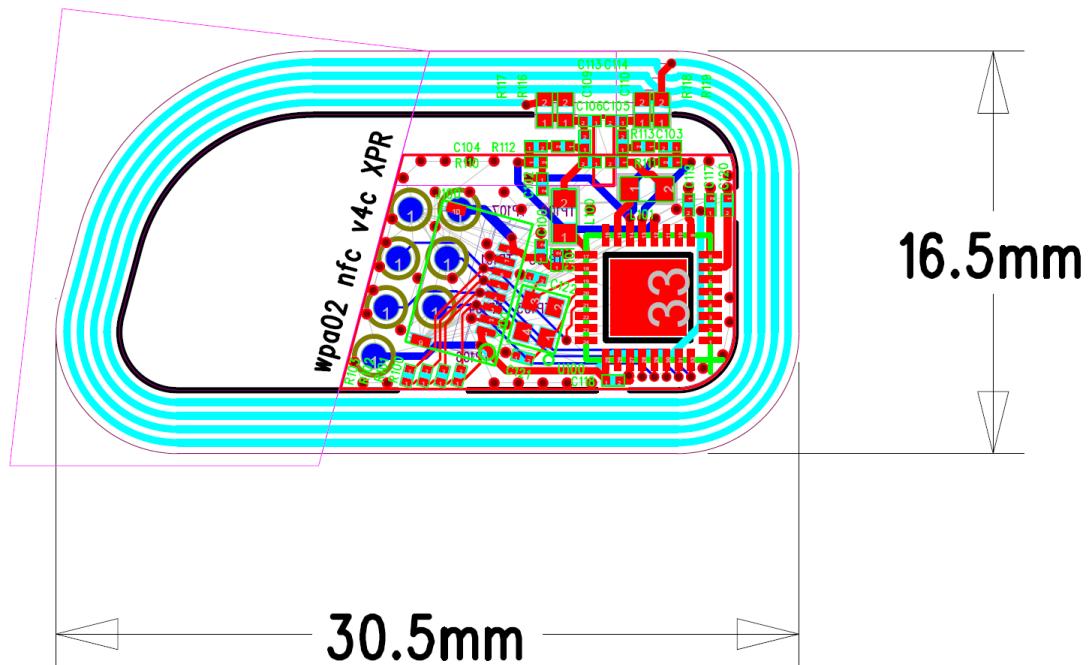
THE FOLLOWING INFORMATION IS UNDER NDA AND MAY BE MADE PUBLIC FOR THE PURPOSES OF CERTIFICATION

VIII   Analysis

The following figure shows the output of the synthesis tool used for design:

Figure 2: NFC coil synthesis tool

Length (amax)	30.5	mm
Width (bmax)	16.5	mm
Track width (w)	300	µm
Gap between tracks (g)	250	µm
Additional Overlap Area (A)	0	mm^2
Track Thickness	35	µm
Number of Turns (N)	4	
Turn exponent (E)	1.67	
PCB Thickness	0.6	mm
Er	4.3	

Inductance (Lant)	776	nH
Lant min	704	nH
Lant max	996	nH
Capacitance (Cant)	1.3	pF
Resistance (Rant)	0.98	Ω
Self resonance (Fres)	161	MHz
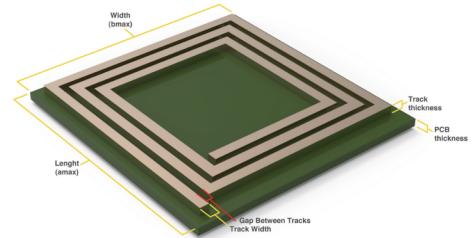
Measures on real circuits confirm the values indicated in the Coil Electrical Characteristics.