



Figure 93: NFCT antenna recommendations

The required tuning capacitor value is given by the below equations:

$$C'_{tune} = \frac{1}{(2\pi \cdot 13.56 \text{ MHz})^2 \cdot L_{ant}} \quad \text{where } C'_{tune} = \frac{1}{2} \cdot (C_p + C_{int} + C_{tune})$$

$$\text{and } C_{tune1} = C_{tune2} = C_{tune} \quad C_{p1} = C_{p2} = C_p \quad C_{int1} = C_{int2} = C_{int}$$

$$C_{tune} = \frac{2}{(2\pi \cdot 13.56 \text{ MHz})^2 \cdot L_{ant}} - C_p - C_{int}$$

An antenna inductance of $L_{ant} = 2 \mu\text{H}$ will give tuning capacitors in the range of 130 pF on each pin. The total capacitance on **NFC1** and **NFC2** must be matched.

8.13.11 Battery protection

If the antenna is exposed to a strong NFC field, current may flow in the opposite direction on the supply due to parasitic diodes and ESD structures.

If the battery used does not tolerate return current, a series diode must be placed between the battery and the device in order to protect the battery.

8.13.12 Digital Modulation Signal

Support for external analog frontends or antenna architectures is possible by optionally outputting the digital modulation signal to a GPIO.

The NFCT peripheral is designed to connect directly to a loop antenna, receive a modulated signal from an NFC Reader with its internal analog frontend and transmit data back by changing the input resistance that is then seen as modulated load by the NFC Reader.