Measurement setup

In following picture the measurement setup is shown.

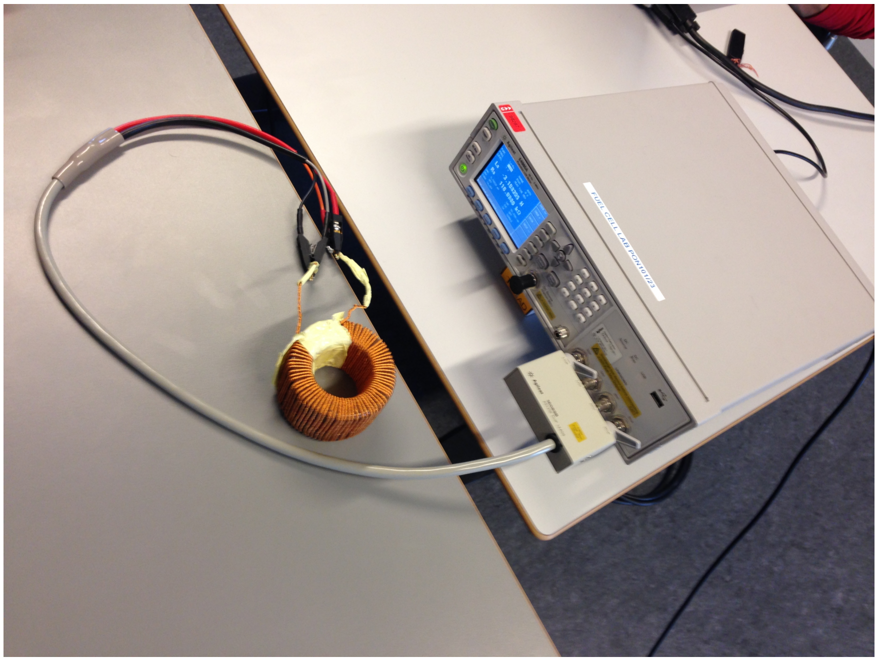

Figure 1: Measurement setup

Inductance

Firstly an toroidal core, which can be seen in fig 2 is measured.

Figure 2: Toroidal core

Fig 3 shows the equvialent scheme of an inductance. The measurments are carried out to get the resistance and the inductance.

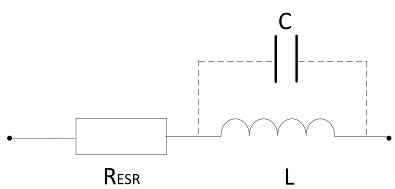

Figure 3: equivalent scheme of an inductance

As from the graphs in fig 4 can be seen that at the frequency range from 1kHz up to 100kHz the phase shift is around +90°. In this frequency range the Inductance is calculated as:

$$L = \frac{X_l}{2 \cdot \pi \cdot f} = \frac{60\Omega}{2 \cdot \pi \cdot 10kHz} = 0.9549mH$$

The serial resistance can be seen at low frequencies, when AC voltage is approx DC Voltage. Hereby the resistance out of the graph is

$$R_s = 0.3\Omega$$

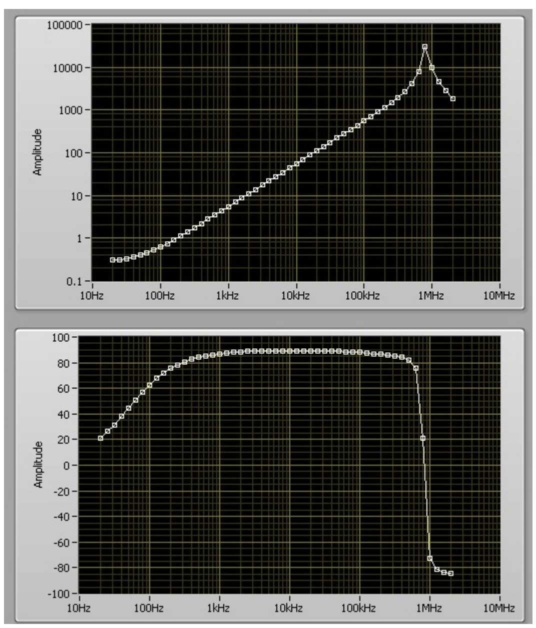

Figure 4: Toroidal core graph at V = 3mV

	Specified	Measured
Inductance [mH]	-	0.9546
serial Resistance[Ω]	-	0.3

In the table the specified data of the inductanced is not in the list, since it was not labled on the device.

Capacitance

In following picture the capacitance can be seen, which was used for the measurements.

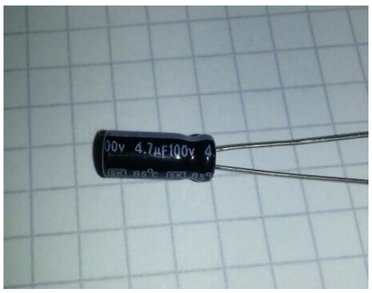

Figure 5: Capacitor

The equivalent scheme of a capacitor is displayed in figure 6.

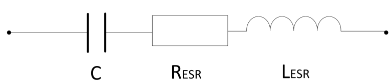

Figure 6: equivalent scheme of a capacitor

As from the figure 7 can be seen:

At low frequency at approximately 100Hz the phase shift is -90degrees. In this frequency range the the real capacitor is calculated as

$$C = \frac{1}{2 \cdot \pi \cdot f \cdot X_c} = \frac{1}{2 \cdot \pi \cdot 100Hz \cdot 350\Omega} = 4.547\mu F$$

The resistance can be seen as a frequency of approx. 100kHz, where the phase shift is 90° and the gain is constant.

$$Rs = 1.5\Omega$$

	Specified	Measured
Capacity [μF]	4.7	4.547
serial Resistance [Ω]	-	1.5

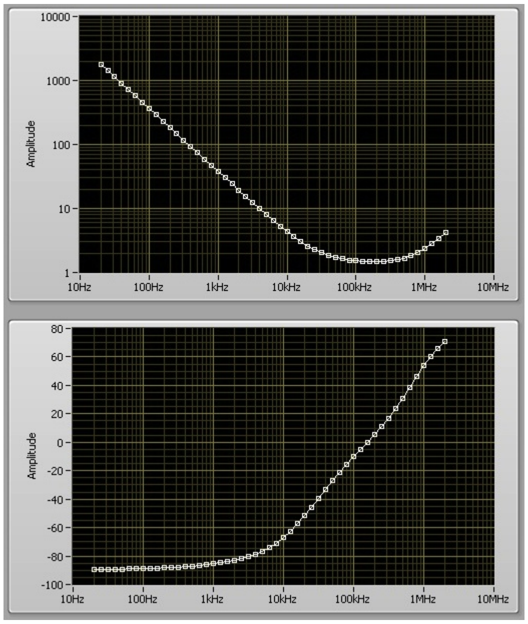

Figure 7: Capacitor graph