

Measurement accessories

To measure the impedance of components with the «series» **configuration**, we use a small PC board with two SMA connectors.

The component is soldered on the PC board or pressed on the PC board with a clothes pin or with a plastic stick.

The safer method is the soldering contact, but often, we do not want to get the component dirty with solder.



To calibrate, we use a 51 ohms resistor (smd 1206 or 0805) as reference load. For the short circuit, we used a very small sheet of copper. The small gap on the PC board trace is equivalent to a 0.051pF capacitor; this capacitor is automatically removed with the process of calibration (it does not matter its value).

The width of the gap between the traces is 0.4 mm.

To reduce the capacitance of the gap, the thickness of the dielectric is locally reduced (about 0.6mm) just under the gap. (We tried to reduce this capacitance because this capacitance is not removed when we measure without calibration).

With **this** PC board, we tried to evaluate the capacitance and the inductance of our (1206 and 0805) smd resistors. (These evaluations are perhaps completely false !!!)

A resistor (1206) soldered with the marking on the top (the normal use) has an inductance of 0.775nH.

A resistor (1206) soldered with the marking turned toward the PC board, has an inductance of 0.29nH.

A resistor (0805) soldered with the marking on the top (the normal use) has an inductance of 0.571nH.

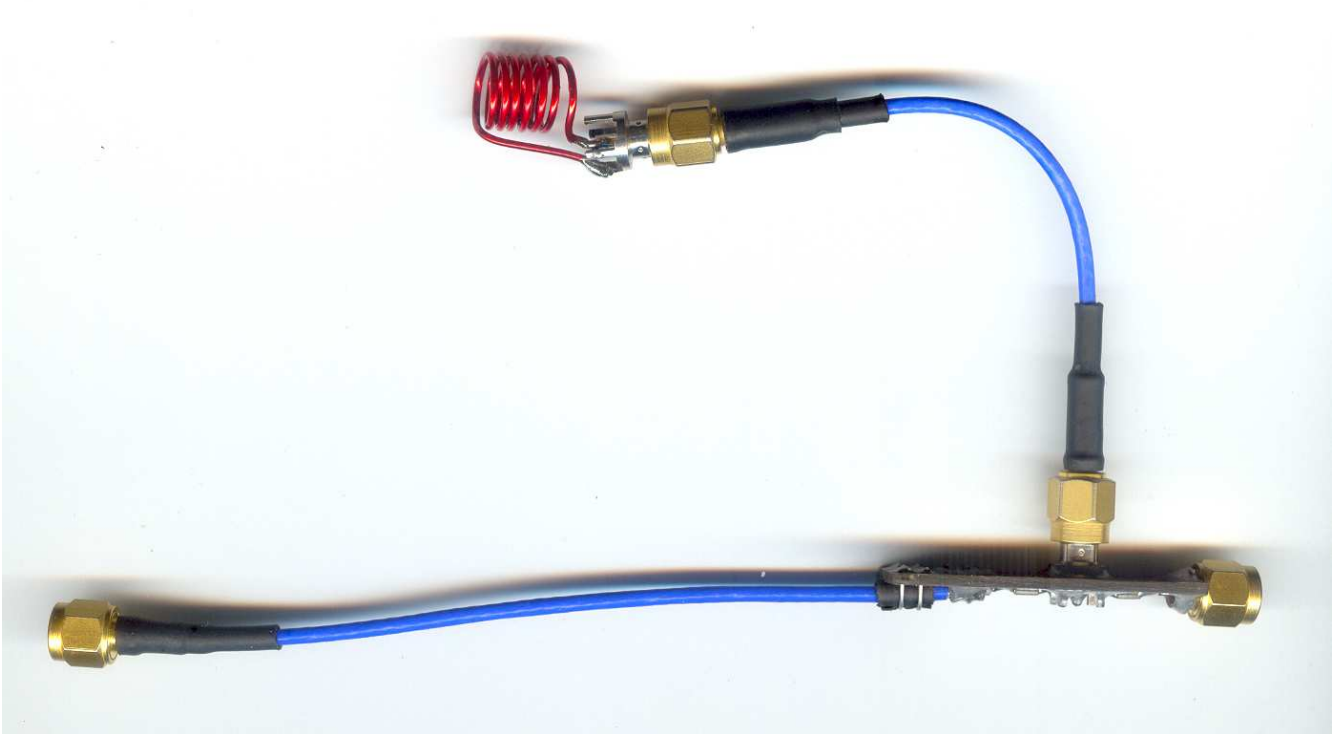
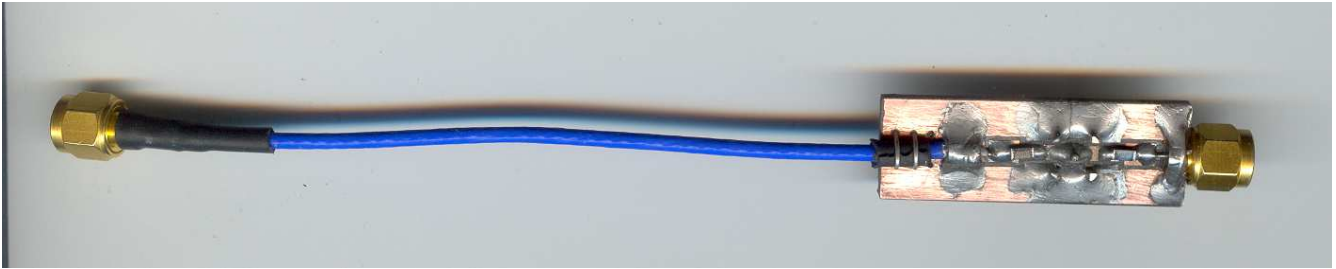
A resistor (0805) soldered with the marking turned toward the PC board, has an inductance of 0.171nH.

A resistor (1206) has a capacitance of 0.075pF.

A resistor (0805) has a capacitance of 0.083pF.

The capacitance of the gap (0.051pF) is not included in these values.

To measure a component with the «parallel» configuration, we use a small PC board with 3 SMA connectors. There are two 50 ohms resistors on the PC board.



On this picture, we can see the «parallel» accessory, connected to an helical air coil inductor for measuring.

To calibrate, we use these 3 SMA connectors. One for the short circuit, one for the open circuit, one for the 50 ohms reference load. The reference load uses two 100 ohms resistors (in parallel), (smd 1206). With these two resistors, the capacitance of the resistors seems to be compensated by their inductance (up to 60MHz). We can have $L=0\text{nH}$, $C=0\text{pF}$.

