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Technical report 300-QV-13 On 300 MHz quadrature volume coil for rodent imaging in vivo

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Institute for Biodiagnostics

National Research Council Canada

For: Dr. Richard Buist, University of Manitoba, Winnipeg

Technical report 300-QV-13

On 300 MHz quadrature volume coil for rodent imaging *in vivo*

Vyacheslav Volotovskyy and Boguslaw Tomanek

This technical report includes:

- description of the coil (page 2)
- schematics of the coil (Fig. 1)
- photo of the coil (Fig. 2)

The probe for a rodent head *in vivo* MR imaging incorporates a quadrature inductively coupled volume RF coil. RF resonator (eight element high pass bird cage) is embedded into the shielded matching/tuning assembly 112 mm long. RF system has adjustable tuning and matching. Inner diameter of the resonator is 33 mm, its length is 50 mm. Coil elements are made of 8 mm wide adhesive copper tape attached to the acrylic pipe. 18 pF capacitors are used to achieve a 300 MHz resonance frequency.

Total length of the set-up is about 112 mm, its outer diameter is approximately 85 mm. Inductive matching network is employed to connect resonator with a quadrature hybrid. Unloaded Q value for the coil is about 220. Quadrature isolation for an empty/loaded coil is better than 20 dB. Tuning range is from 300 MHz up to 304 MHz.

To tune and match the RF coil:

- Attach a cable connected to the channel of interest to the sweeper
- Leave a second (unused) cable attached to the quadrature hybrid input
- Turn matching rod responsible for the channel of interest to achieve a proper matching.
- Turn tuning rod responsible for the channel of interest to achieve a proper tuning
- Repeat the same procedure with a second channel

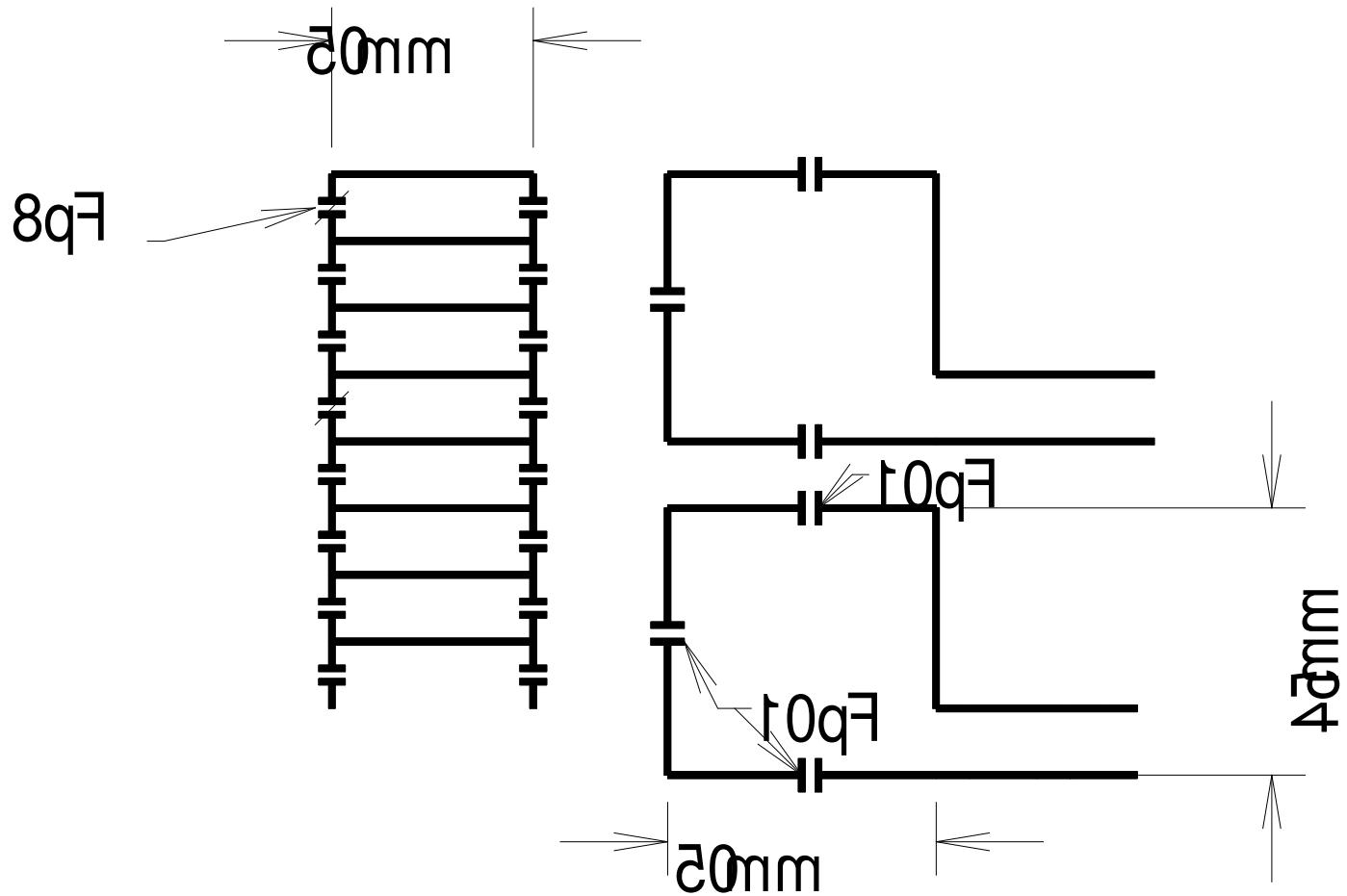


Fig.1. Schematics of the coil

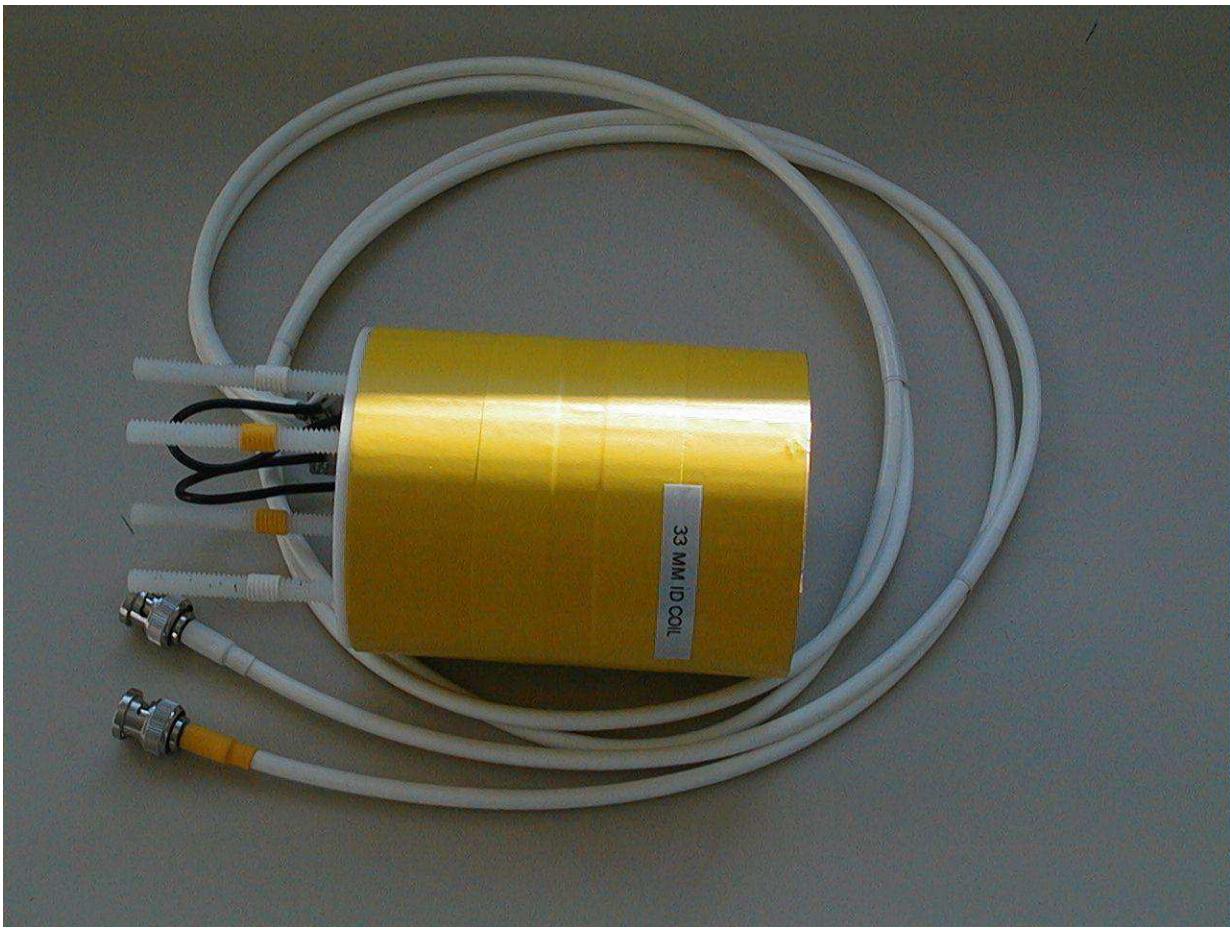


Fig.2. Picture of the set-up.