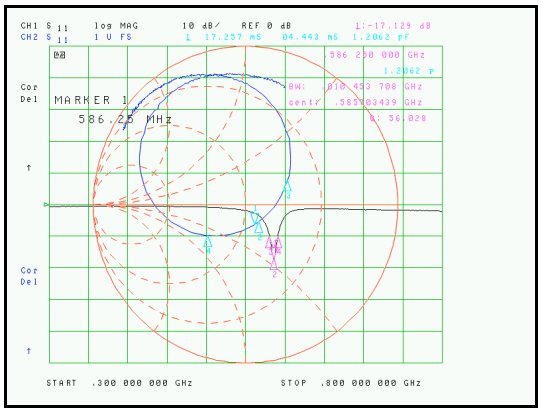
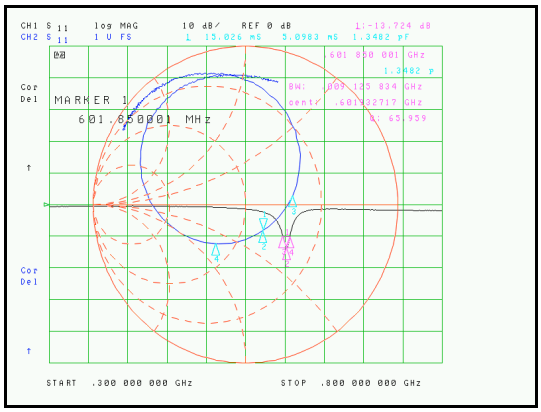
General:
The resonance of the PCB radiator alone resulted in poor performance compared to the discrete coil. The end of the coil was replaced with a short coil as a compromise between performance and construction and is referred to as the 'Hybrid Coil".

A phantom and paraffin wax were used to estimate the loading effects of the animal and the encapsulant. The presence of the animal resulted in a shift of 425 to 400 MHz while the encapsulant resulted in a 23% drop in wax and an estimated 27% drop if urethane is used. In summary, a resonant frequency of 585 MHz is estimated to result in operation of 400 MHz after encapsulation and when placed on the animal.

The construction of the Hybrid Coil is described. The return loss performance at the maximum and minimum capacitance is shown. L9 is installed as 5.6nH.



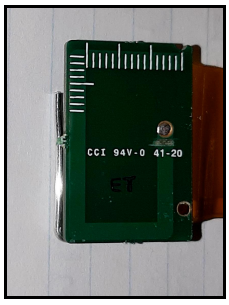
Max Capacitance, 586.25 MHz



Min Capacitance, 601.85 MHz

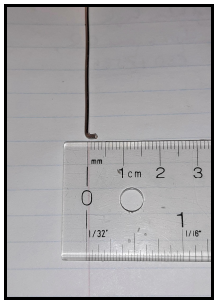
Modifications:

PCB Radiator Removal:
Sever the PCB radiator at the position shown. Two cuts through the radiator ~1.5mm apart with the copper between removed.

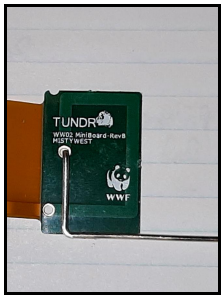


Hybrid Coil Construction:
Starting with a straightened, 6 cm, length of #16 AWG wire.

Initial Bend:
This forms the connection to the PCB. The tail needs to be long enough to allow soldering into the via on the PCB but not so long that it extends through the PCB once soldered. The coil is spaced 1.6mm above the PCB so a length of ~2.5mm is desired. As a spacer is used for positioning this length is critical only for mechanical attachment.

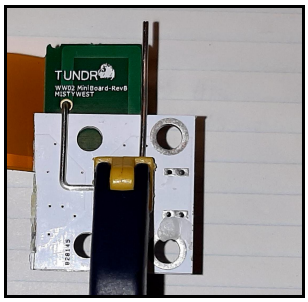


First and Second Bends:
The coil is bent using the edge of the PCB as a length gauge. Positioning the pliers at the edge results in the outside of the bent coil falling within the confines of the PCB due to the bend radius of the wire (or very close).

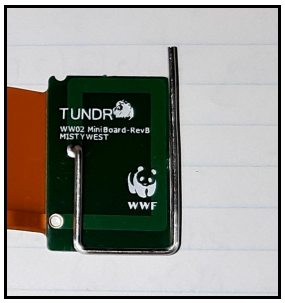


Vertical Position:
The coil is clamped to the resonator assembly using a scrap piece of PCB for consistent vertical spacing (1.6mm). The coil is manually aligned with the edges of the PCB and then soldered. The coil is then trimmed to length, 8mm from the top PCB edge.

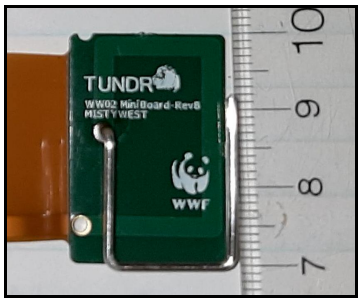
Note: Clamping the assembly onto a second piece of scrap material will prevent solder flow through the via. This is to avoid mechanical conflicts with the mount.



Clamped



Soldered



Trimmed