we analyze the loss contributions in a small, 50-mm-diameter receive-only coil for carbon-13 (13C) magnetic resonance imaging at 3 T for 3 different circuits, which, including active decoupling, are compared in terms of their Q-factors and signal-to-noise ratio (SNR). the results show that a circuit using unsegmented tuning and split matching capacitors can provide 20% SNR enhancement at room temperature compared with that using more traditional designs. the performance of the proposed circuit was also measured when cryogenically cooled to 105 K, and an additional 1.6-fold SNR enhancement was achieved on a phantom. the enhanced circuit performance is based on the low capacitance needed to match to 50 when coil losses are low, which significantly reduces the proportion of the current flowing through the matching network and therefore minimizes this loss contribution. this effect makes this circuit particularly suitable for receive-only cryogenic coils and/or small coils for low-gamma nuclei.