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(54) **System and method for automatic tuning of a magnetic field generator**

(57) An automatic tuning system for a magnetic field generating tuned circuit includes a processor configured to maintain the resonant frequency of a tuned circuit equal to a reference frequency. The tuned circuit is driven by a power amplifier whose output provides an amplified signal at the reference frequency. The tuned circuit includes a magnetic field generating inductor and a bank of individually switchable capacitors controlled by the processor capable of adding and removing the respective capacitances to and from the tuned circuit. The inductor includes a Faraday shield to shield the tuned circuit from the influence of electric fields. A power sense circuit monitors the power delivered by the power amplifier to the tuned circuit and the processor sequentially switches the capacitors in a binary progression for-

mat to achieve maximum power delivery indicative of conforming the resonant frequency of the tuned circuit to the reference frequency. In an alternate embodiment of the invention, the inductor includes a plurality of taps that provide individually selectable inductance values available for use in the process of conforming the resonant frequency of the tuned circuit to the reference frequency. In further alternate embodiments, the variable capacitor is in the form of a motor driven variable capacitor and the tuning sequence relies on a phase locked loop using the phase of a reference frequency signal and the phase of the inductor current as control parameters.

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