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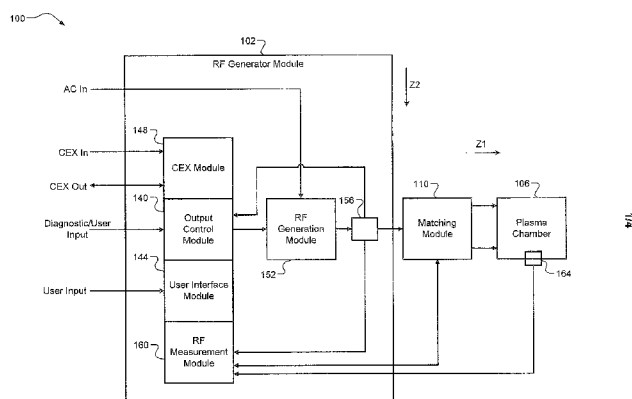
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(54) **Title:** VIRTUAL RF SENSOR**FIG. 1**

(57) **Abstract:** A radio frequency (RF) generation system includes an impedance determination module that receives an RF voltage and an RF current. The impedance determination module further determines an RF generator impedance based on the RF voltage and the RF current. The RF generation system also includes a control module that determines a plurality of electrical values based on the RF generator impedance. The matching module further matches an impedance of a load based on the RF generator impedance and the plurality of electrical components. The matching module also determines a 2 port transfer function based on the plurality of electrical values. The RF generation system also includes a virtual sensor module that estimates a load voltage, a load current, and a load impedance based on the RF voltage, the RF generator, the RF generator impedance, and the 2 port transfer function.