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## **Palm-Size-Integrated Microwave Power Module at 1.35-GHz for an Atmospheric Pressure Plasma for biomedical applications**

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Atmospheric Pressure Plasmas have pioneered a new field of plasma for biomedical application bridging plasma physics and biology. Biological and medical applications of plasmas have attracted considerable attention due to promising applications in medicine such as electro-surgery, dentistry, skin care and sterilization of heat-sensitive medical instruments [1]. Traditional approaches using electronic devices have limits in heating, high voltage shock, and high current shock for patients. It is a great demand for plasma medical industrial acceptance that the plasma generation device should be compact, inexpensive, and safe for patients. Microwave-excited micro-plasma has the highest feasibility compared with other types of plasma sources since it has the advantages of low power, low voltage, safety from high-voltage shock, electromagnetic compatibility, and long lifetime due to the low energy of striking ions [2]. Recent experiment [2] shows three-log reduction within 180-s treatment of *S. mutans* with a low-power palm-size microwave power module for biomedical application. Experiments using microwave plasma are discussed. This low-power palm-size microwave power module board includes a power amplifier (PA) chip, a phase locked loop (PLL) chip, and an impedance matching network. As it has been a success, more compact-size module is needed for the portability of microwave devices and for the various medical applications of microwave plasma source. For the plasma generator, a 1.35-GHz coaxial transmission line resonator (CTLR) [3] is used. The way of reducing the size and enhancing the performances of the module is examined.

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