

Portable Microwave Power Excitation System Based on Substrate Integrated Waveguide Resonator for Rapid DNA Extraction

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Abstract

We are facing a crisis in the 21st century since bacteria are now become resistant to all known antibiotics. It is important to use the antibiotics we have, or newly developed ones, very wisely. Key step of this is rapid identification of the bacterial DNA, so that the healthcare worker can deduce the origin of the infection and recommend its correct treatment. Microwave resonant cavity driven by a high-efficiency microwave power amplifier is an enabling technology in a portable rapid DNA release system [1] and, as is the case in wireless communications application, achieving high efficiency over broad bandwidth is the main design challenge for battery operated system. Substrate integrated waveguide is a good candidate in portable microwave power delivery system for its integration into planar circuit board [2]. In the DNA release system, the variation in permittivity of the sample during microwave excitation will be presented to the microwave transistor as a dynamic load impedance. Systematic characterization of the permittivity variation can then be used in high efficiency continuous mode power amplifier design [3].

Keywords: *Power amplifier, substrate integrated waveguide, resonator, healthcare*

References

- [1] 1. A. Imtiaz, et al, IEEE TMTT, 2015, 63, 3007-3015.
- [2] 2. X. -P. Chen, et al, IEEE Microw. Magazine, 2014, 15, 121-133
- [3] 3. S. C. Cripps, et al, IEEE MWCL, 2009, 19, 665-667.

Biography

Heungjae is currently working as a Ser Cymru Research Fellow at the Centre for High Frequency Engineering, School of Engineering, Cardiff University. His most current research is non-invasive blood glucose monitor. He is very keen on working with people from other disciplines, such as Physics, Chemistry, Pharmacy and Medicine to find more applications of microwave technology and tackle larger-scale challenges.