EPT and Local SAR Estimation by Complex B1 Mapping at 7T

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The electrical properties (EPs) of biological tissue provide important diagnostic information within radio and microwave frequencies, and is an important factor in specific absorption rate (SAR) calculation. The recently proposed electrical properties tomography (EPT) technique aims to reconstruct EPs in biological tissues based on B1 measurement. However, for single coil element in multi-channel transceiver coil arrays which is increasingly utilized at UHF for B1 inhomogeneities correction, current B1-mapping techniques could not provide adequate complex B1 information (magnitude and absolute phase) that is essential for EPT, electric field and quantitative local SAR estimation. Using a 16-channel transceiver coil at 7T, we report our approach (Figure 1) for complex transmit and receive B1 mapping for individual coil element, as well as in-vivo EPs imaging of the human brain. With these information, subject-specific local SAR can be directly estimated quantitatively.

![Diagram of the approach](image)

**Figure 1.** Schematic diagram of the approach (PD: proton density).