Conformal Antenna Applicator for Traumatic Brain Injury Assessment

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Traumatic Brain Injury (TBI) is a major cause is defined as the trauma caused by the injury to the head and according to Center for Disease Control (CDC), TBI is the major cause of death worldwide. Most TBI injuries are related to traumas sustained at the battle field therefore males experience more TBIs than females. Other major causes of TBI include falls and vehicle accidents. Depending on the severity of the TBI, the effects can be behavioral, physical, social, cognitive, and emotional. The injury can be fatal or can leave the person disable for life. The most effective way of diagnosing TBI is through Magnetic Resonant Imaging since MRI provides excellent soft tissue contrast. Different treatment options are followed based on the severity of the TBI ranging from medication to emergency surgery. Because TBI can be fatal, the early diagnosis and treatment is the key to save lives. According to CDC, a significant percentage of the people are not killed instantly but after a period of time if they do not receive proper assessment and treatment. Although MRI is the most effective technology for assessment, unfortunately, it is very expensive and the bulkiness of the equipment prevents it to be used in many different setting such as battlefield. In order to provide a quick and cost effective assessment technology, in this study, we investigate conformal microwave arrays. We consider different frequencies to study the sensitivity and efficacy of the antenna array. We also provide ex vivo measurement using pig brain and skull phantoms.