

State of Libya
Ministry of Education
Al Asmarya Islamic University
Faculty of Engineering
Design Multi-RF Coils for MRI

This graduation project is submitted to Al Asmarya Islamic University in partial fulfillment of the requirements of the award of bachelor's degree in Electrical and Computer

Engineering Communication Engineering

BY

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Abstract:

Magnetic resonance imaging (MRI) is a device used for medical diagnosis, it considered one of the best imaging methods to clarify tissues and organs in the human body. Within the innovation of an MRI system, high image quality and less imaging time become the major researching target. multi-RF coils method are used to improve the magnetic flux density of 7 Tesla MRI in this project.

Using mathematical equations, the dimensions of the surface coil were calculated at appropriate to the used frequency (7T), and then these dimensions were used to design a coil using Computer simulation technology (CST), then a phantom design simulating the human body in internal structure, where the average permittivity and conductivity of all components of the human body were calculated, and inserting results in CST and designing the phantom to obtain simulate reality results.

Scattering Matrix parameter (S- parameter), magnetic flux and Specific Absorption Rate (SAR) were calculated to define the benefits from the proposed method, the results show that using two RF-coils can improve the magnetic flux density by 42 % compared with one RF-coil.