

Team 307
Project Scope

A Narrow Band “Oscilloscope” for High Power Tuning of NMR Probes

Project Description

Assemble a prototype which includes a Software Defined Radio (SDR) of choice in addition to specified software running in a host computer to behave like an oscilloscope. The prototype will have a trigger coming from the power source to start the recording of data; these experiments can last days, and therefore require efficient memory or buffer capabilities. The SDR will do so by measuring the Radio Frequency (RF) pulses obtained from experiments where a bi-directional coupler is inserted between an RF power amplifier and a probe to allow the user to monitor Reflected Power (RP).

Key Goals

To design and deliver a product prototype demanded by stakeholders. To reduce the cost of envelope detection by using an SDR instead of an actual oscilloscope.

Other goals: display length of sweep, display control frequency, display enough bandwidth for a spectroscopist, display the envelope, and lastly to aim for a prototype that produces the necessary “oscilloscope” like output.

Markets

Magnet laboratories, tech-based companies, government and defense companies, service providers, and colleges or researchers attempting to implement such experiments.

Assumptions

Assumed access to the FAMU-FSU Magnet Laboratory and its capabilities to supply components deemed necessary for the testing of the prototype, limited budget, ability to choose how to implement the project description, and efficacy at a user-friendly interface.

Stakeholders

FAMU-FSU Magnet Laboratory

Keysight

Researchers that use NMR Technology