In Situ NMR Project Specifications

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# Embedded Computing

The embedded computing will generate the high-frequency excitation signal and process the received signal. This will include embedded machine learning for classification and wireless data transfer. Energy consumption and ease of modification\updating of both hardware and software are of high importance.

#### Excitation Signal Generation

* Operate up to 30 MHz with a bandwidth of 30 MHZ @ 1 dB
* Start at the same phase (preferably 0 for sine wave) every time it’s triggered
* Have a minimum adjustment of 1 kHz (i.e. 24.001 MHz, 24.002 MHz…)
* Update speed of 100 MS/s
* Output range: ±1V
* Resolution: 10-bit precision (5 mv on a ±3V signal)

#### Data Acquisition

* Channels: 1
* Channel type: single-ended
* Input range: ±1V
* Resolution: 10-bit (1.9 mV on a ±1V signal)
* Sample rate 100 kS/s (for a ~10 kHz NMR signal)
* Input impedance: 1MΩ and less than 20pF
* Analog bandwidth: 1010-40: 20 MHz @ 3dB, 8 MHz @ 0.5dB, 4 MHz @ 0.1dB
* Input protected to: ±50V