

AbstractID: 8256 Title: ACR MRI Accreditation Equipment Performance Evaluation for Various Scanner Settings

Purpose:

ACR MRI Accreditation program was created a decade ago for assessing performance by various facilities. Accreditation was voluntary at that time. Recently many stand-alone MRI imaging centers/clinics seek accreditation because it is now mandatory by some insurance companies. For ACR MRI physics survey/system performance evaluation, it is closely correlated with the equipment performance. It is a challenging task to survey a variety of magnets in different field strength, configurations, and with many software versions/optional packages. The purpose of this work is to summarize ACR MR system evaluation and ACR phantom test experience.

Method and Materials:

GE, Siemens, Philips, and Hitachi's MRI magnets, in fixed or mobile setup, ranging from 0.3T, 0.7T, 1.0T, 1.5T, to 3.0T are surveyed. Both ACR and site T1/T2 scan protocols are used.

Results:

It is found that when an MRI scanner is properly maintained, geometric accuracy, slice thickness accuracy, and percent signal ghosting is usually within the limit regardless of fixed or mobile setup, or field strength of the magnet. However, intensity uniformity and low contrast detectability are most demanding for very low field (<0.5T) and 3.0T magnets. At a low magnetic field, it is caused by low signal to noise ratio. For a 3.0T magnet, it is caused by low RF penetration at high field strength, and a much higher acceptable limit for low contrast detectability. In some cases, site protocol for T1 and T2 pulse sequences is required to pass the ACR phantom test.

Conclusion:

The ACR MRI phantom testing items are designed for different scanner performance criteria. When a testing result is out of the ACR acceptable limit, it is important for the physicist to recognize whether the phantom is not setup properly, or it is caused by scan parameter selection, or a service call is necessary.