

Suggested elements of a general acceptance testing procedure for MRI systems will be presented. Specific tests of each subsystem, including the static magnetic field, gradient magnetic field subsystem, radiofrequency field subsystem, and computer systems, will be discussed. Available published guidelines for acceptance testing will be reviewed and acceptance criteria from such guidelines will be presented. Additional tests and acceptance criteria required for evaluating the performance of modern high-speed MRI scanners will also be suggested.

While the large diversity in capabilities of scanners from various vendors precludes the presentation of a single comprehensive acceptance test procedure, generalized testing procedures for all major subsystems using phantoms that are easily manufactured or commercially available to clinical medical physicists will be described. Acceptance tests that are difficult, or impossible, for typical practicing clinical medical physicists to independently perform without assistance of the vendor's installation or field service engineers will also be discussed, along with suggested approaches to incorporate vendor tests with independent evaluations.

Educational Objectives:

The clinical medical physicist will understand and be prepared to implement a general acceptance testing procedure that will evaluate all major subsystems of modern MRI scanners.

Upon completion of this course, participants will be prepared to:

1. Understand the tests needed to evaluate the performance of the static magnetic field, gradient magnetic field, radiofrequency field, and computer subsystems.
2. Understand typical acceptance criteria.
3. Develop a set of acceptance tests and acceptance criteria that are specific to the capabilities of the MRI system to be evaluated.
4. Determine the feasibility of measuring specific acceptance test parameters independently as opposed to using evaluation tools provided by the vendor to its installation and/or field service engineers.