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Research on Radiated Emission Measurement Method for Medical Ultrasound Diagnostic Equipments

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All medical electrical equipment generates electromagnetic radiated disturbances, and the emission levels should comply with the limits required by relevant standards to protect the public radio services in the electromagnetic environment where they are located. Existing international standards only provide general methods and basic principles for measuring radiated emission. For ultrasound diagnostic equipment, including ultrasound tomography equipment, it is not clear under what arrangement or working conditions the maximum emission level can be obtained. Here, we conducted theoretical and experimental studies on various scenarios, including parameter settings, transducer selection, operating modes, and whether to use tissue-mimicking ultrasound phantoms. We found that under the same test conditions, the test results using phantoms were significantly higher than those without phantoms. In addition, different operating modes and transducer configurations can also have a significant impact on the measurement results. Collectively, we propose a specific measurement method for radiated emissions of imaging-type ultrasound diagnostic equipment, which is of great significance for improving the electromagnetic compatibility level of such equipment and ensuring the reproducibility of measurement results.

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