# Automated Anechoic Chamber Product Description

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In academic and industrial research there is often a need to characterize the radiation emitted by electrical devices, such as the 3-dimensional radiation pattern of an antenna or the parasitic radiation pattern of a component from which it is critical to minimize radiation. This is typically done by measuring the power received by an antenna with known properties, at a variety of orientations relative to the device under test. Anechoic chambers are necessary for such measurements because microwave-frequency radiation would otherwise reflect from obstacles in the surrounding environment, obfuscating results. It is convenient for antenna positioning to be automated because manual positioning is tedious and imprecise.

The automated anechoic chamber is a modification to a pre-existing 2 GHz–20 GHz anechoic chamber at CU Boulder to allow this kind of automated antenna positioning. It enables radiation measurements at orientations that can be chosen with precision of better than $1°$ on each actuated axis, with minimal need for human interaction. Experiments can be controlled and results can be recorded and displayed through a high-level interface, allowing for quick and easy observation and interpretation of radiation properties. This product can facilitate research by faculty, graduate and undergraduate students at CU Boulder, as well as by visiting researchers from the defense and wireless communication industries who commonly rent out the anechoic chamber. While automated anechoic chambers are not a novel concept, this product is tuned to the specific use cases of CU Boulder faculty and therefore costs two orders of magnitude less than competing products; thus, it is an appealing solution for university departments and small companies with limited resources. Its software interface also makes it easy to execute measurement modalities that are useful to CU Boulder faculty and to digest and analyze their results, even for users with limited software and microwave experience.