SENIS - Customer Reference:
Hprobe - France

“We empirically evaluated the magnetic stray field over a bandwidth of DC-500Hz in different types of cars (Renault Clio, BMW i3, Peugeot 308). The magnetic field is measured at motor, alternator, doors, battery, fusebox, speakers and breakers areas and were recorded using calibrated 3D Hall transducer I3C from SENIS AG.
To verify magnetic immunity of STT-MRAM on wafers we designed an ATE with a vectorial field generator to reproduce the stray field. The field direction and its strength is controlled by the SENIS 3D Hall probe.”

Siamak Salimy,
Co-founder and CTO of Hprobe, France

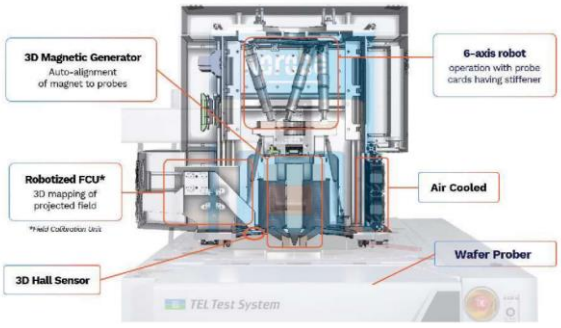
Hprobe, France
www.hprobe.com/

The successful integration of STT-MRAM into automotive products necessitates a comprehensive assessment of the memory's magnetic immunity and its ability to withstand potential magnetic fields present in real-world applications. In cars, the primary source of magnetic fields arises from permanent magnets.

To address this, Hprobe conducted an empirical evaluation of the magnetic stray fields in various types of cars, such as Renault Clio, BMW i3, and Peugeot 308. The assessment covered a wide bandwidth from DC to 500Hz and encompassed critical areas like motors, alternators, doors, batteries, fuse boxes, speakers, and breakers. These measurements were taken using a calibrated high-precision analog 3D Hall transducer I3C from Senis AG.

To further verify the magnetic immunity of STT-MRAM on wafers, Hprobe designed an advanced Automatic Test Equipment (ATE). This ATE is equipped with a vectorial field generator capable of replicating the exact field direction and strength observed during the empirical evaluation. Precise control of the vector magnetic field and its strength is achieved through the use of the SENIS 3D Hall probe.

This comprehensive evaluation and testing process ensure the reliable performance of STT-MRAM in automotive applications, making it well-suited for the demands of modern vehicles.



ATE (Automatic Test Equipment) designed by Hprobe, France for magnetic immunity tests of STT-MRAM using SENIS 3D Hall probe - reprinted from *)

“Customers like our 3D high-precision transducers because it allows to measure the magnetic field vector and its strength with unprecedented accuracy and repeatability very close to the magnet surface and in small gaps. All three components of the magnetic field are measured in one spot.”

- **SENIS AG**

ACCURATE

INVENTIVE

CUSTOMIZED

About SENIS AG

SENIS AG, Switzerland develops, manufactures, and supplies advanced sensors and instruments for magnetic field and electric current measurement as well as the corresponding development and engineering services. Our solutions and services help our clients in the automotive, consumer electronics, test and measurement industries, as well as to research institutes to create powerful, robust and effective products.

**) Source: Siamak Salimy, “Magnetic Resilience in Motion: Evaluating STT-MRAM Chips for Automotive Applications”, Semiconductor Digest, July 2023*