## DESCRIPTION

**MMS-ANALYSIS** is an additional software module of the MMS-1A-RS magnetic field mapper software that can be used for the on-line (during the mapping) and for the offline analysis of the measured data. It visualizes the measured and calculated 3-axis magnetic field data in various, customized and intuitive color coded displays, and tables.

**MMS-1A-RS** is the high-end version of the SENIS Magnetic Field Mapping System that allows users to perform a fast, high resolution mapping of magnetic field around permanent magnets, electromagnets and electronic circuit PCBs. The map of the magnetic field can be presented as color coded 1D, 2D or 3D isometric visual displays and as a table of numerical values of the magnetic field and the geometrical coordinates of measured points. The measured data analysis is performed during the mapping of the magnetic field, so that calculated data required for the analysis can be visualized immediately after the mapping. Measurement reports can be customized and generated as PDF, Word or Excel files by using the additional **MMS-REPORT** software module.

Due to unique features of the applied fully integrated 3-axis Hall probe, all three components of the magnetic field are measured simultaneously at virtually same point (field sensitive area is within a 150µm square). The mapper computer program and its graphical user interface is an extremely easy-to-use-software built on MS Windows platform and NI LabVIEW. Scanning profiles and measured data visualization are fully customizable.

## KEY FEATURES

- **On-line and Off-line (historical) visualization and analysis of the 3-axis magnetic field vector measured around permanent magnets of different sizes and geometries (disc, ring, block, segment and rotors)**
- **User-friendly customization of the measured data visualization and analysis**
- **Comparison of multiple measured data sets**
- **Visualization of all three components of the magnetic field, Bx, By and Bz as well as $B_{xy}$ (in-plane field distribution), $B_{Total}$, $B_{max}$, $B_{min}$, $B_{rms}$, North-South pole**
- **Visualization of the slope (Inclination and Declination), magnetic field homogeneity, angle error**
- **Fourier Analysis (FFT) and visualization of the first 10 harmonics, single and total harmonic distortion**
- **Visualization of the multipole magnetic field – number of poles, min, max, average pole width, pole distribution, pole pitch, pitch error, zero crossing**
- **Visualization of the cracks and inhomogeneity in the magnetized and non-magnetized parts**


*Figure 1:* **Magnetic Field Mapper Software with the optional MMS-ANALYSIS Module**

## MMS-ANALYSIS SOFTWARE MODULE SPECIFICATION

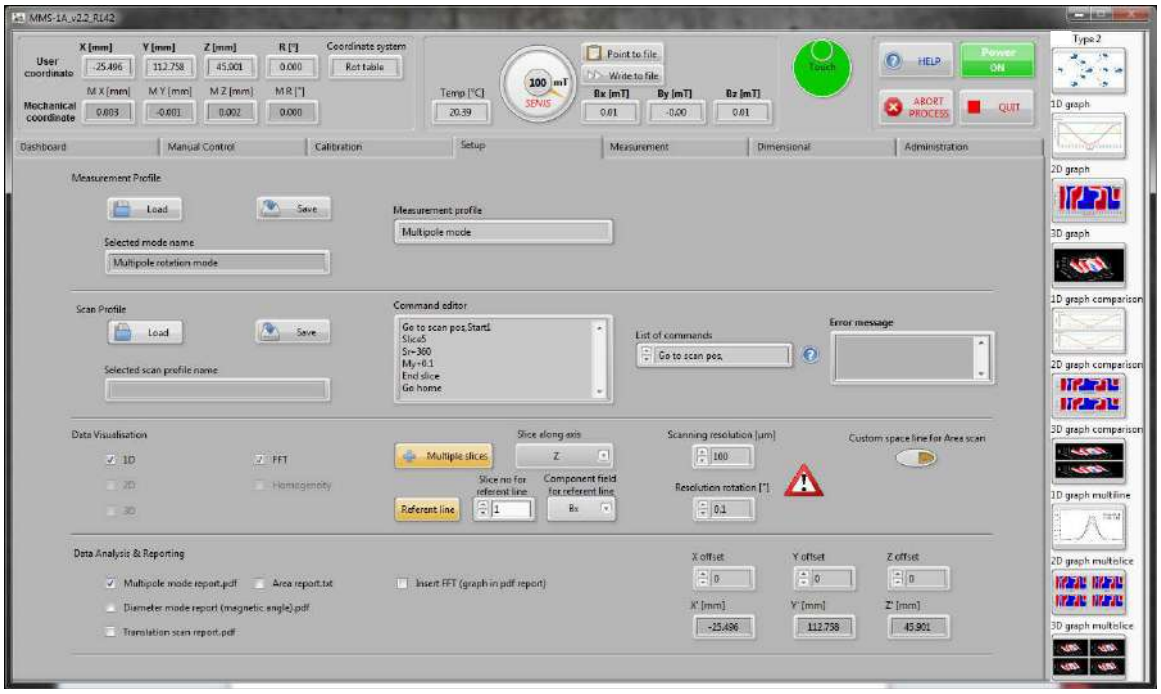


*Figure 2:* **Flexible setup of measurement profiles and scan paths using the command set**

*Figure 3:* **Header Data set-up; Measured data and analysis visualization in the Mapper software**


*Figure 4:* **MMS-ANALYSIS – Scroll Toolbar with selectable Analysis/Visualization Apps icons**

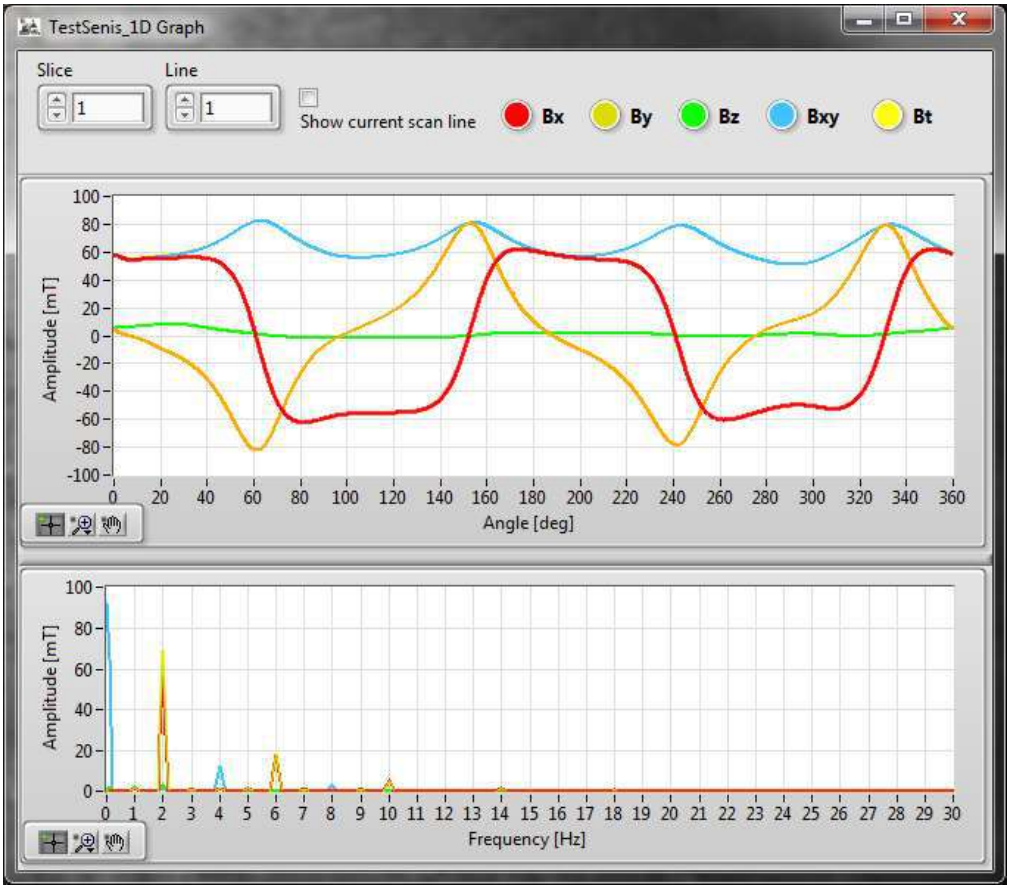


*Figure 5:* **1D Graph-App: Visualization of all three magnetic field components, Bx, By and Bz and $B_{xy}$, $B_{Total}$ Inclination and Declination, as well as Fourier analysis over different scan slices/lines. The individual component presentation can be switched on and off.**

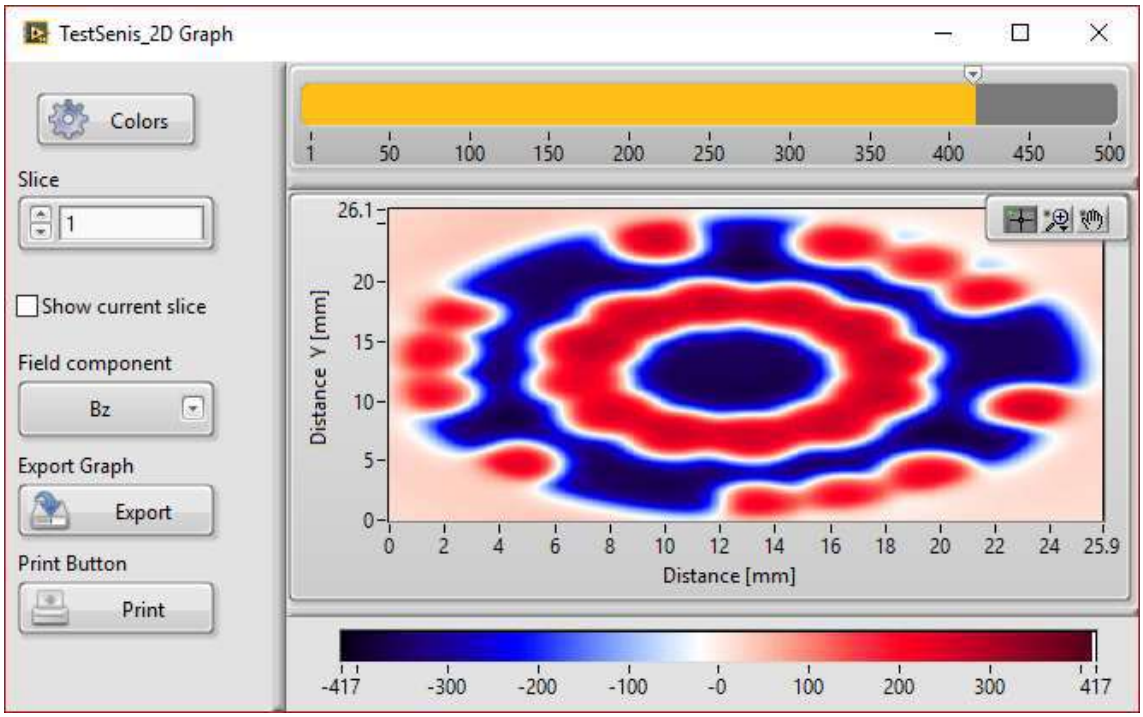


*Figure 6:* **2D Graph-App: Visualization of the selected magnetic field component (Bx, By and Bz, $B_{xy}$, $B_{Total}$). The color scheme (from Greyscale to Rainbow, Seismic, etc.) and the color scale range can be flexibly selected.**

*Figure 7:* **Selection of color schemes, displayed magnetic field component and slice/line**

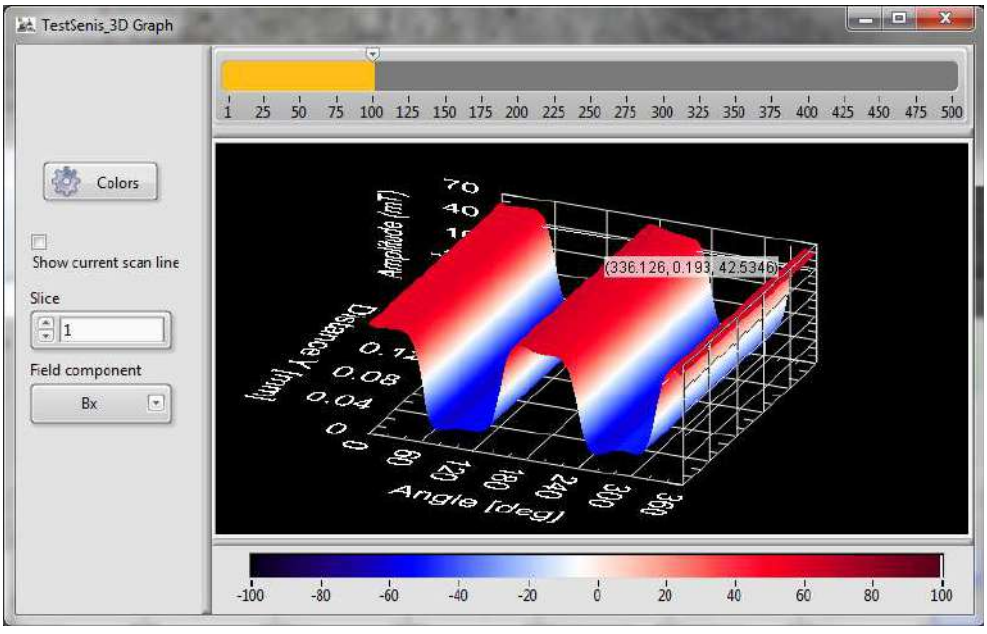


*Figure 8:* **3D Graph-App: Visualization of the selected magnetic field component (Bx, By and Bz, $B_{xy}$, $B_{Total}$). The color scheme (from Greyscale to Rainbow, Seismic, etc.) and the color scale range can be flexibly selected.**

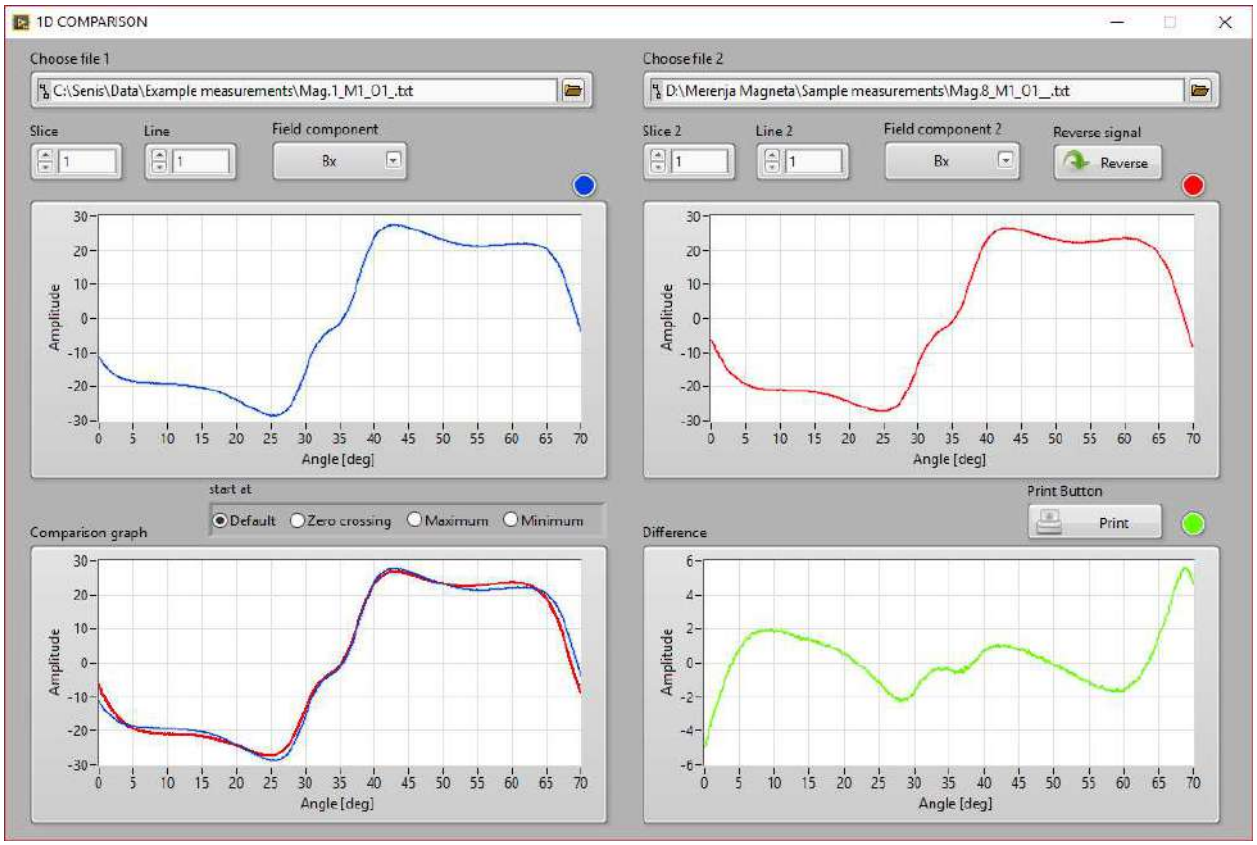


*Figure 9:* **1D Graph Comparison - App: Two or more measurement data-sets are compared, by showing each data separately, then both measured data consolidated on the same graph and the difference between them**

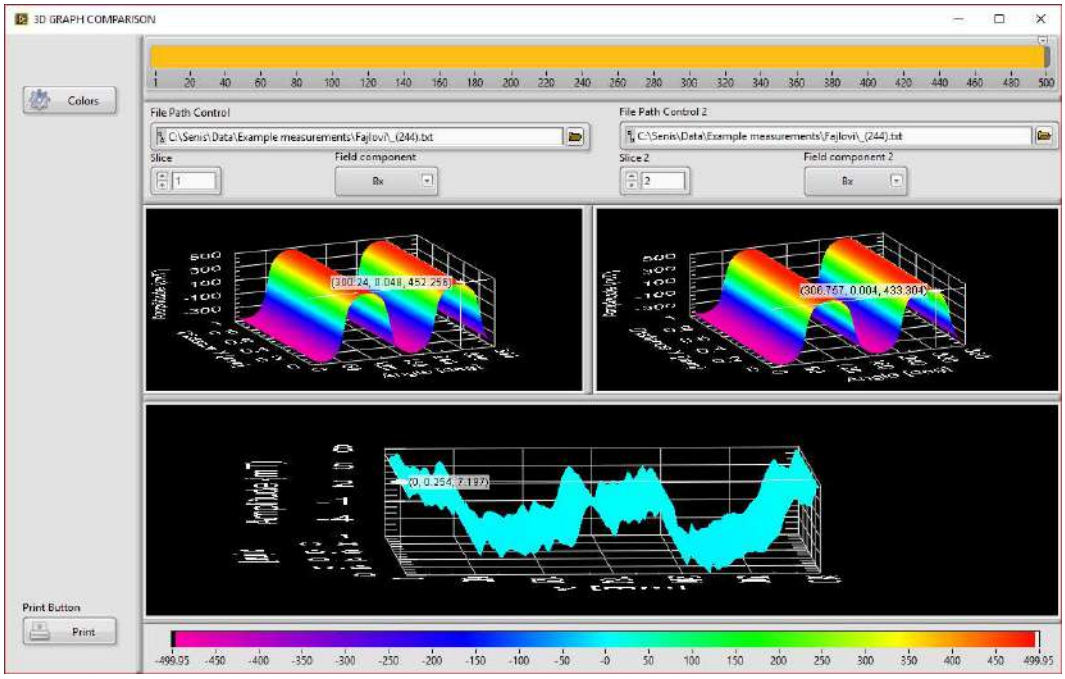


*Figure 10:* **2D and 3D Graph Comparison - App: Two measurement data-sets are compared, by showing each data separately and by showing the difference between two measurements**

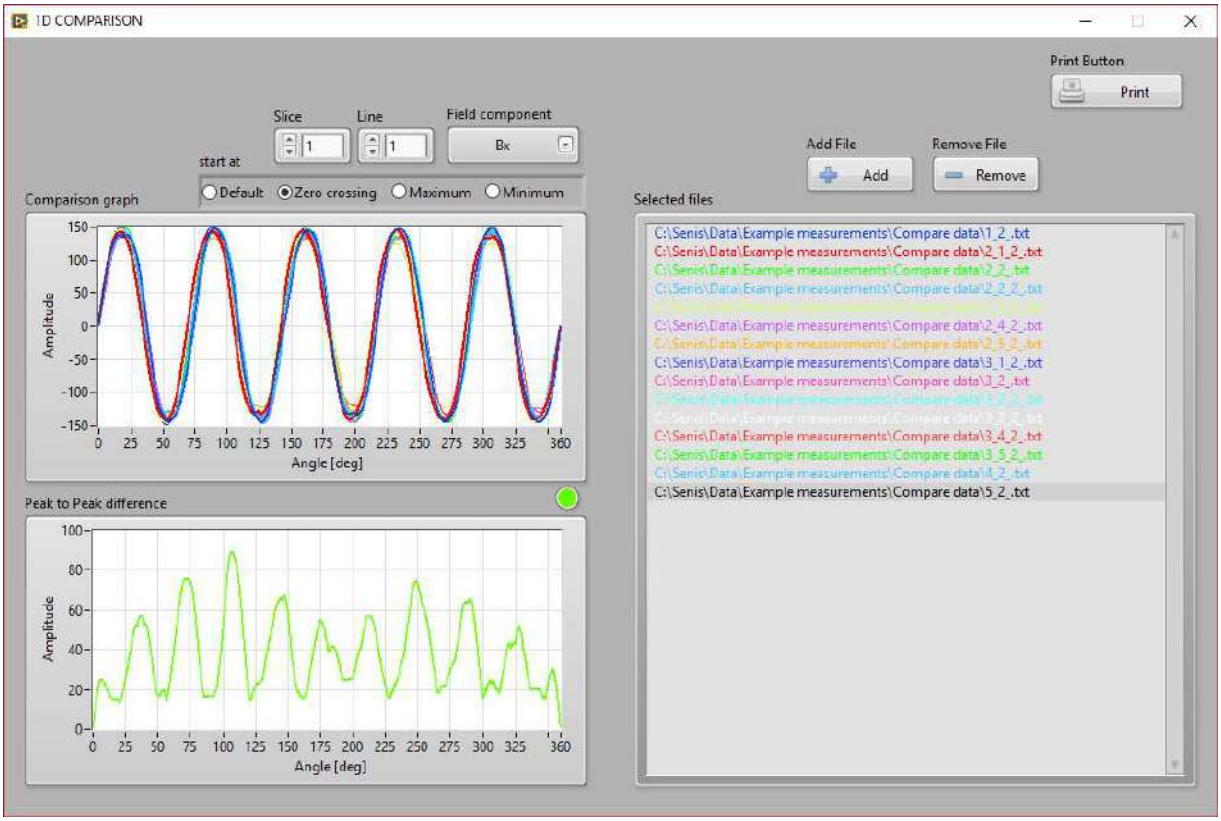


*Figure 12:* **Multi-Graph Comparison - App: Multi-measurement data-sets are compared, by showing each data-set in different colors on the common graph and by showing the largest peak-to-peak difference**

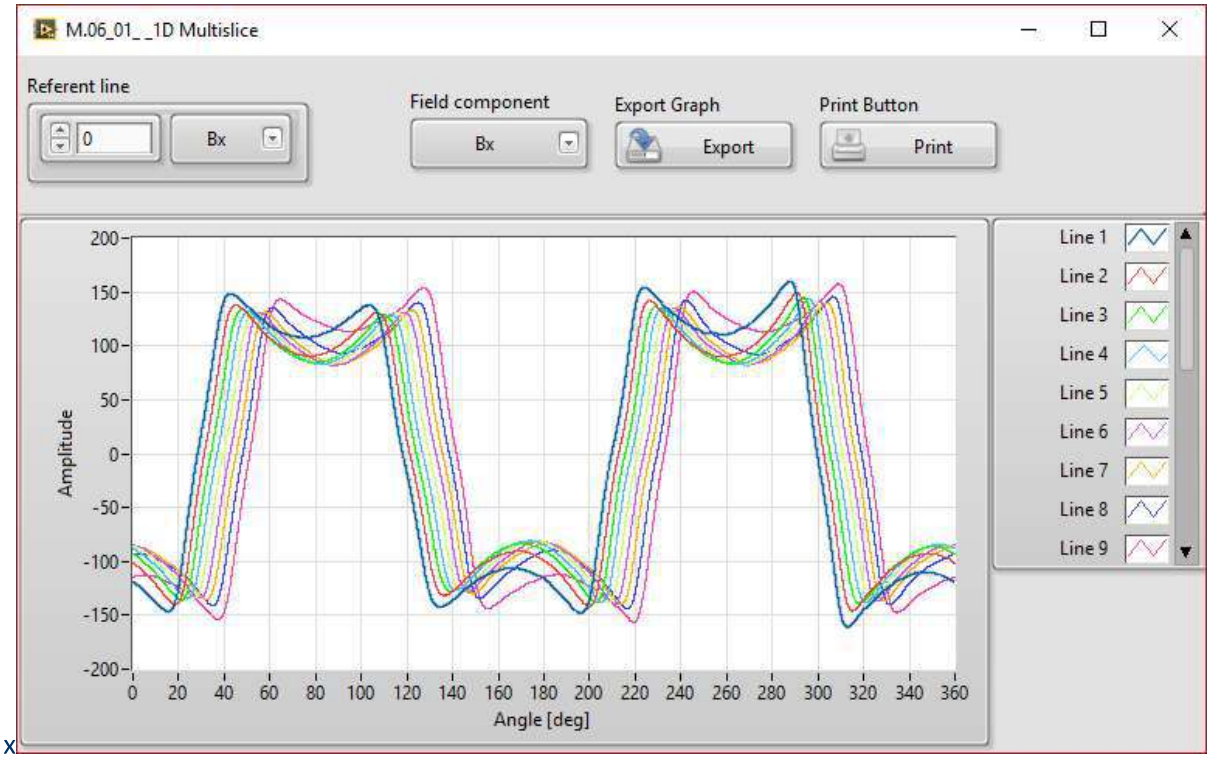


*Figure 11:* **Multislice Analysis - App: Analysis of the magnetic field distribution (selectable magnetic field components) along selected number of scanned lines**


*Figure 13:* **Dipole Magnet Analysis - App: GOOD/BAD Analysis based on the thresholds of Angle Error (Homogeneity), Min/Max values of the magnetic field components and Fourier Analysis**

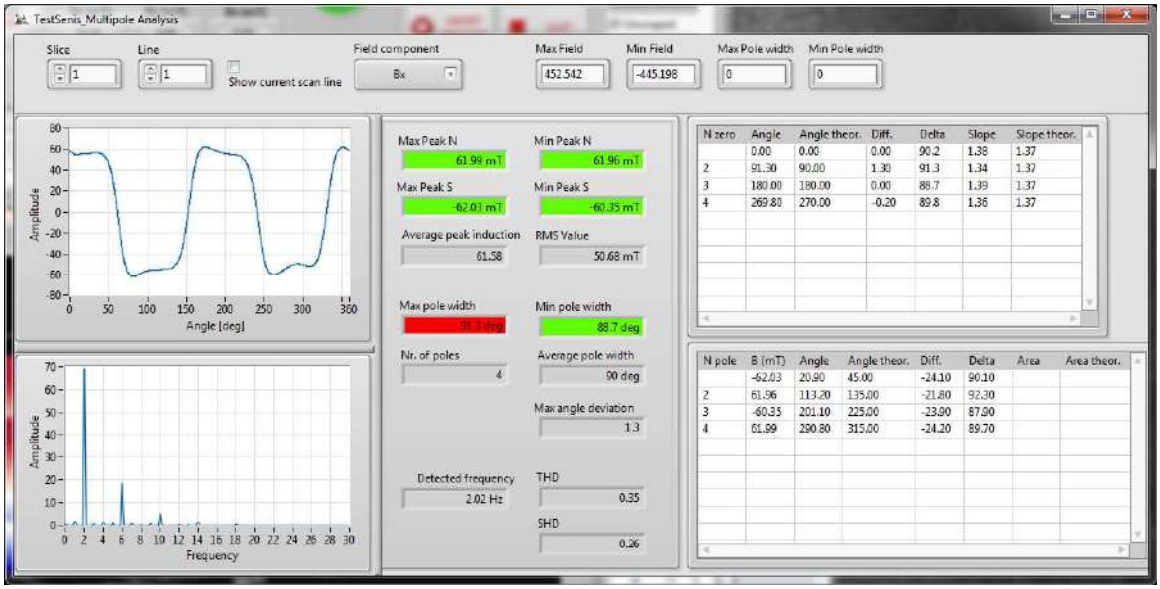


*Figure 14:* **Rotor and Multipole Magnet Analysis - App: GOOD/BAD Analysis based on the magnetic poles distribution and Min/Max values in North/South pole**

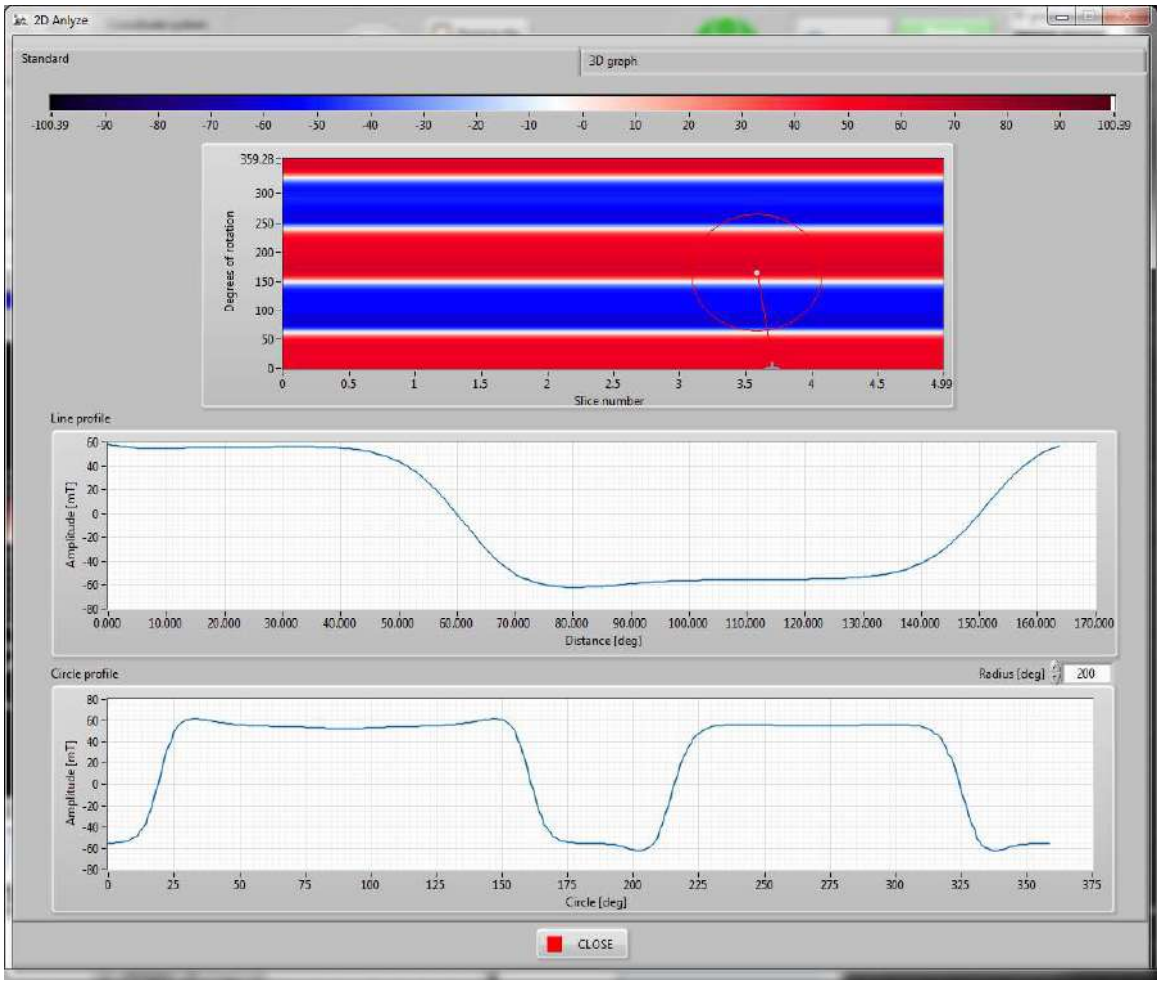


*Figure 15:* **Magnetic Field Analysis - App: Analysis of the magnetic field distribution along a customer-defined line or circle in the unwrapped map**

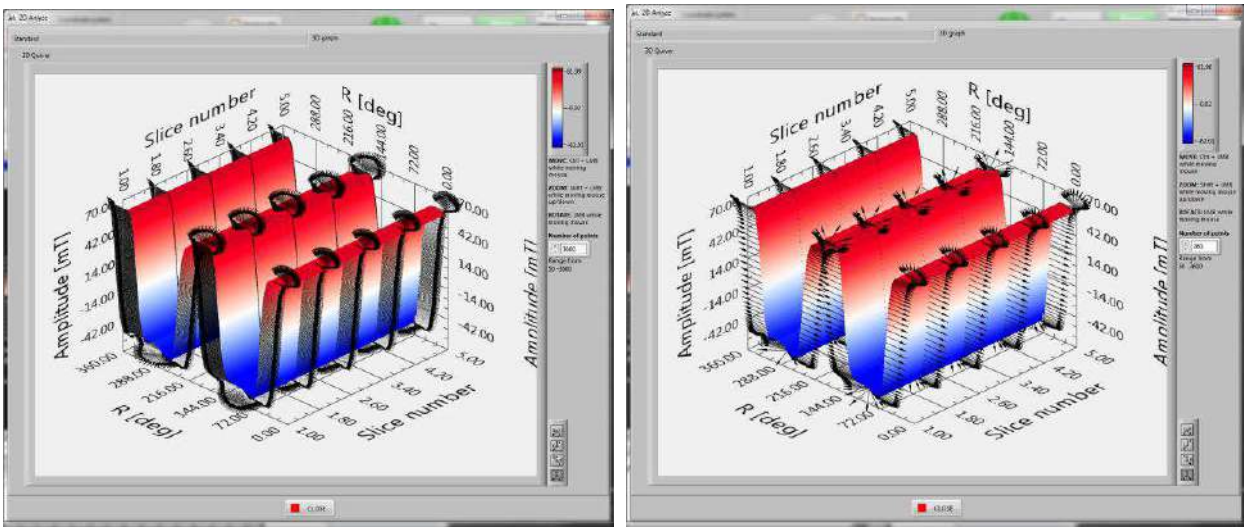


*Figure 16:* **Magnetic Field Lines - App: Analysis of the magnetic field lines along scanned lines**

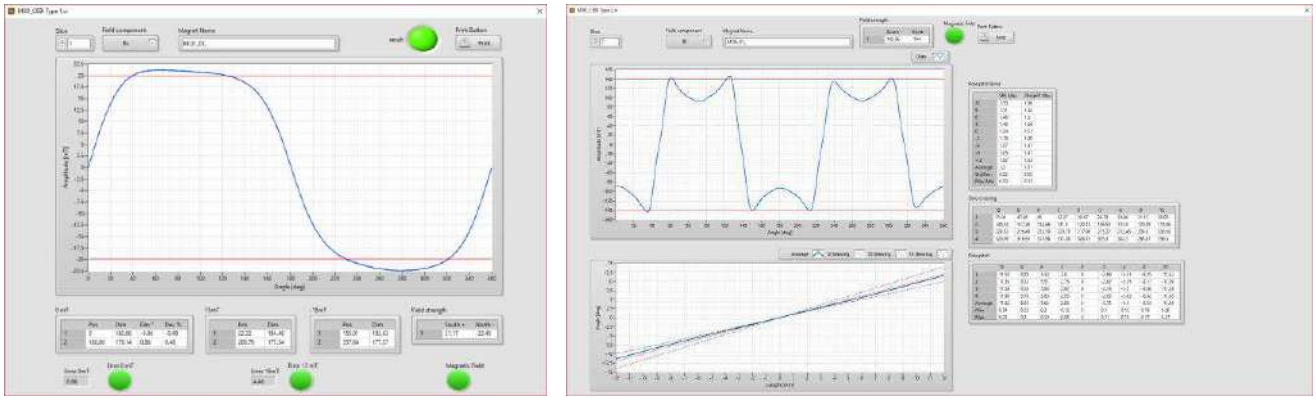

*Figure 17:* **Customized Analysis - App: Analysis of the magnetic field in set points, pole pitch and pitch angle, zero crossing and more**

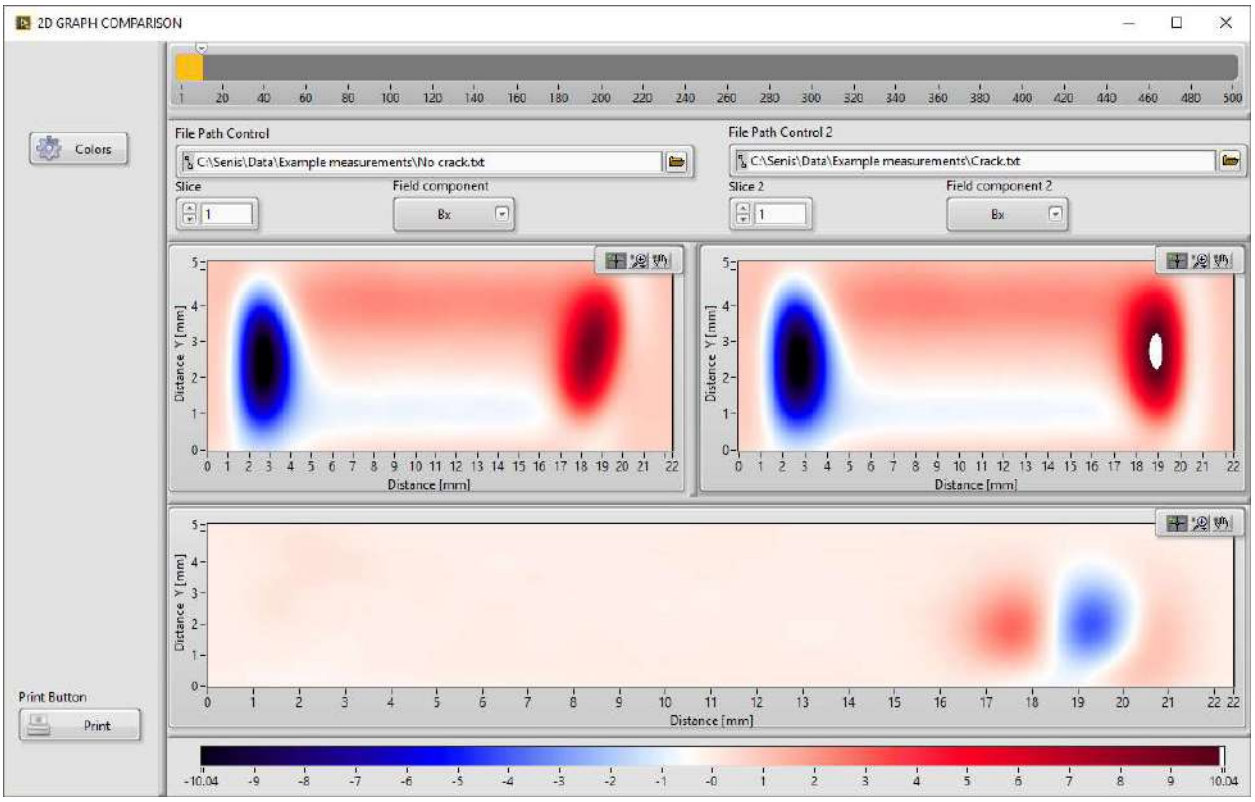


*Figure 18:* **Crack Analysis - App: Detection and location of cracks and material inhomogeneity in the magnetized and non-magnetized parts by comparing to the eddy-current probe measured data of a reference (GOOD) part**