

Unleash the Power of the Smith Chart

An intuitive guide for RF and non-RF engineers

OMICRON 15th Power Analysis & Design Symposium 2026

Organized by,



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2026

About the speaker ...

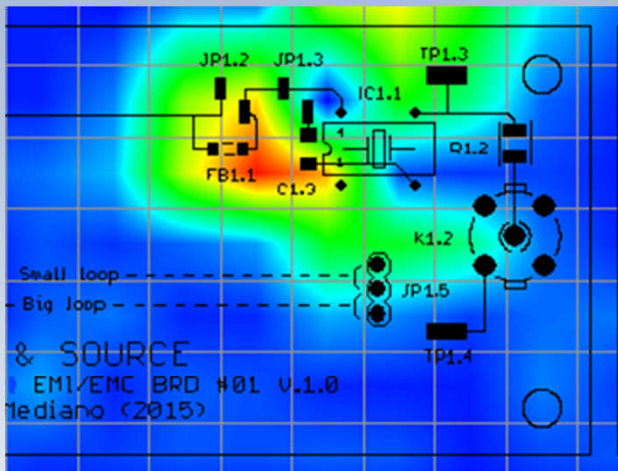
ARTURO MEDIANO – HF MAGIC LAB S.L.



- Faculty member at the **University of Zaragoza** (SPAIN) for >30 years
- Founder **HF Magic Lab S.L.**
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A High Frequency Lab for design, diagnostic, troubleshooting and training



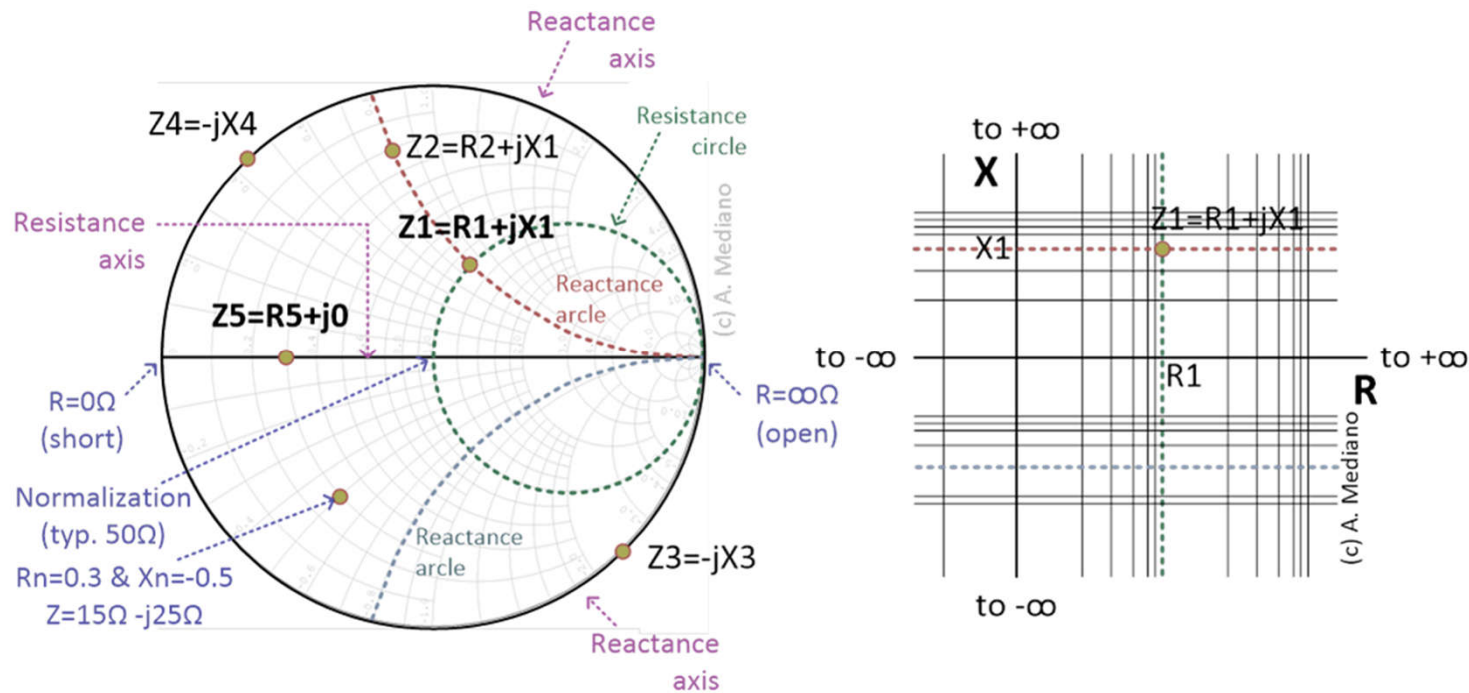
Interferences (EMI)
Electromagnetic Compatibility (EMC)
Signal Integrity (SI)
Radiofrequency (RF)

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Smith Chart ... plotting impedances





Smith Chart ... uses

The Smith Chart is Useful for ...

1. Visualization and Analysis

- Plotting complex impedances (Z) and admittances (Y): easily visualize resistive and reactive components without complex calculations.
- Plotting reflection coefficients (Γ): map magnitude and phase of reflections.
- Evaluating behavior across frequency: how a network changes as frequency sweeps.

2. Network Performance Evaluation

- Calculating VSWR (Voltage Standing Wave Ratio): efficiency of power transfer.
- Assessing Return Loss and Mismatch Loss: Quantify the quality of connection in dBs.
- Stability Analysis: Identify regions of potential instability (amplifier designs).

3. Circuit Design and Optimization

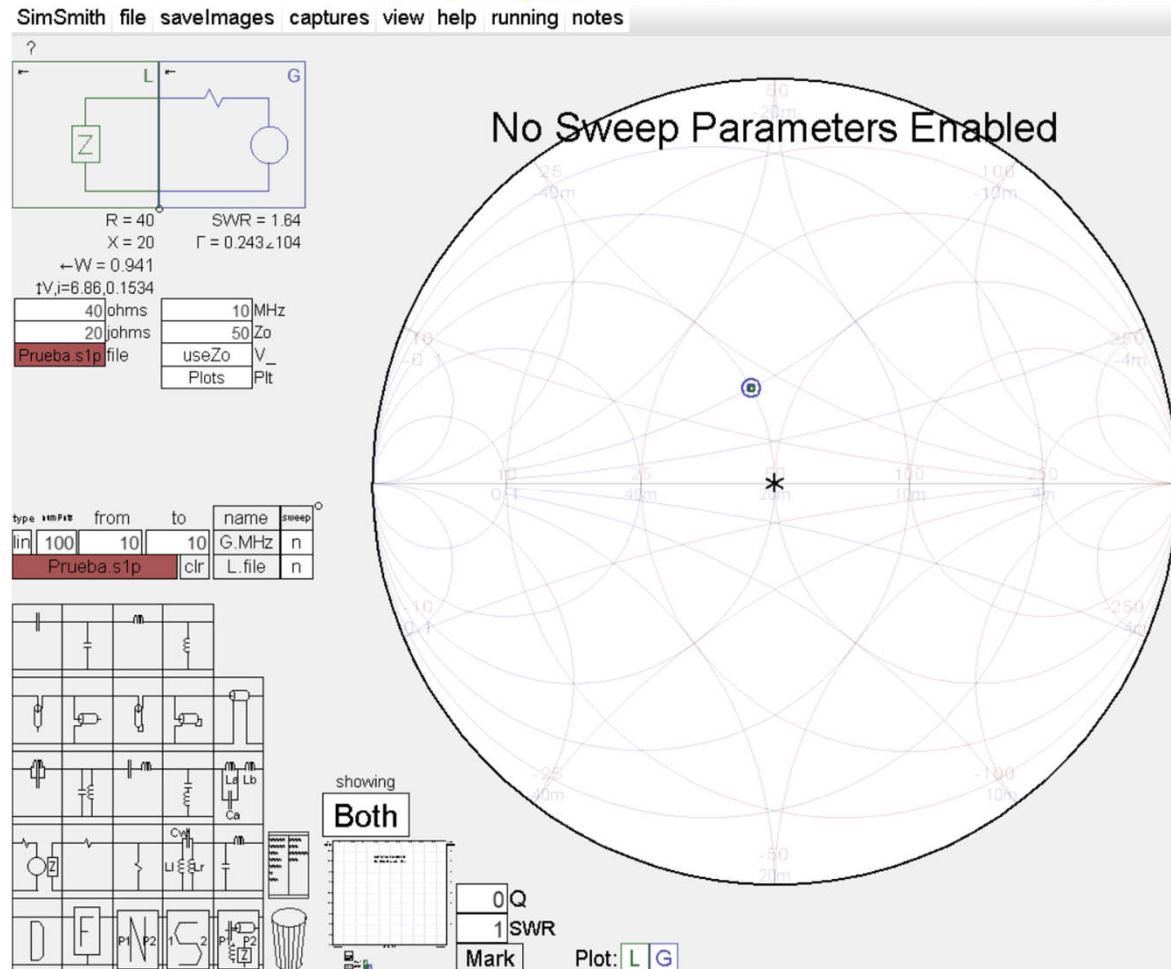
- Impedance Matching: Design L-sections, T-networks, π -networks, ...
- Transmission Line Design: calculate effects of line length, Z_0 , and stubs (short or open).
- Lumped Element Design.
- Impedance Transformation: Design networks that transform an existing impedance to a desired target value for maximum power transfer or other.

4. Your imagination is the limit!



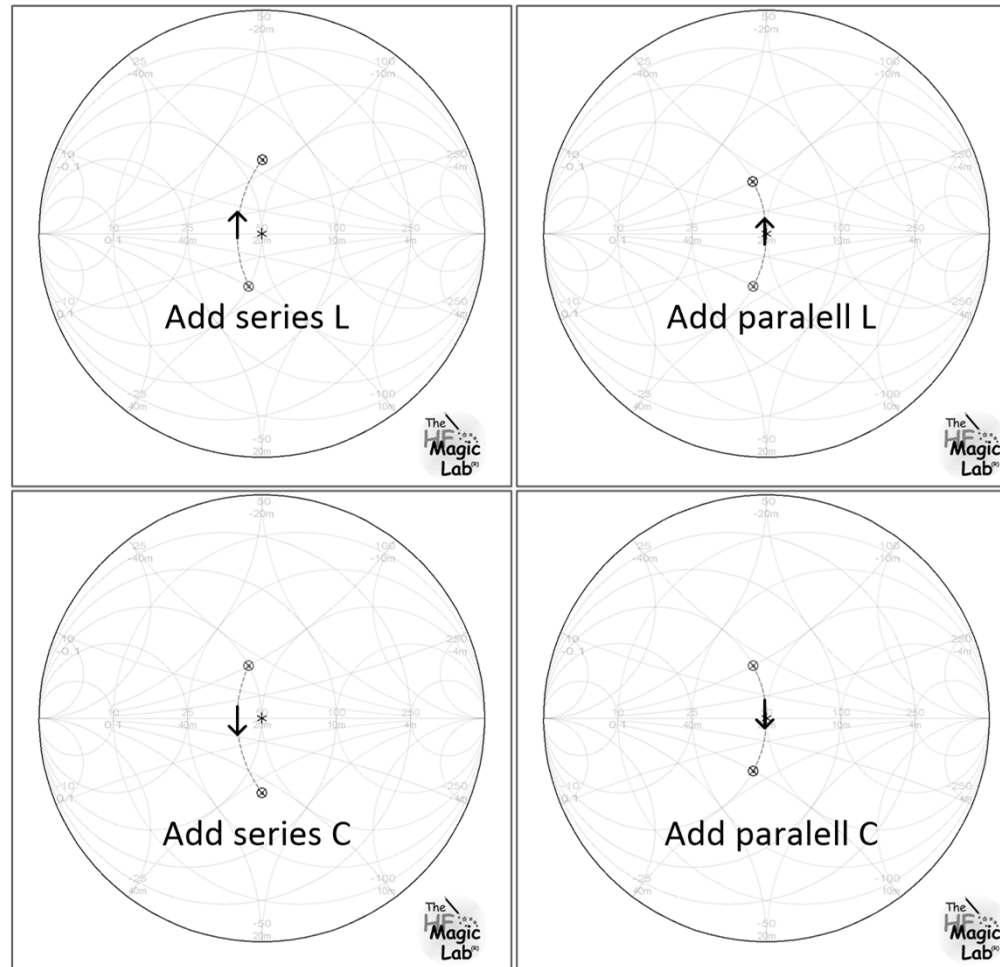


Smith Chart ... SimSmith for our demos



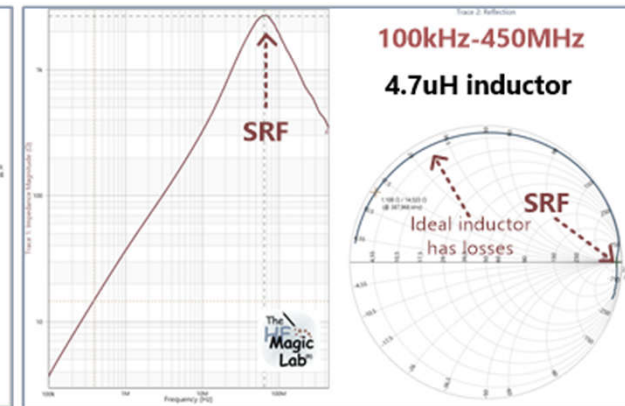
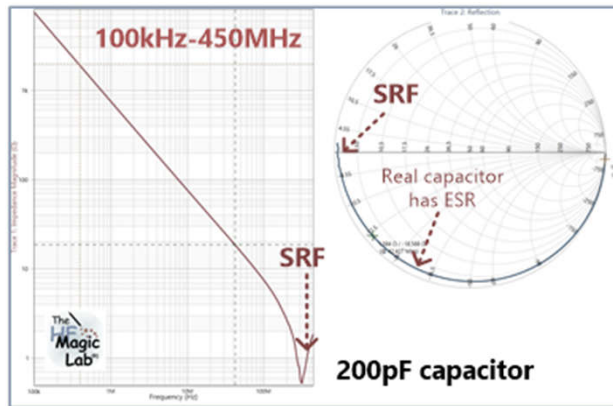
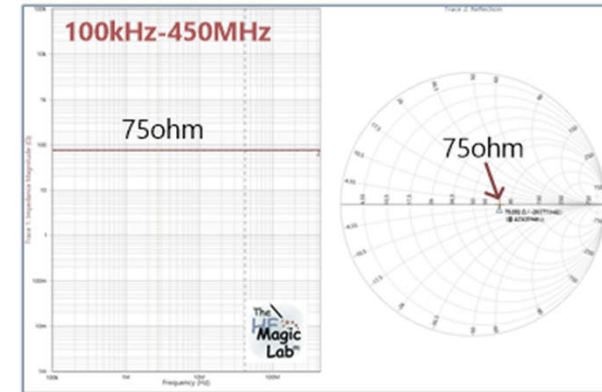
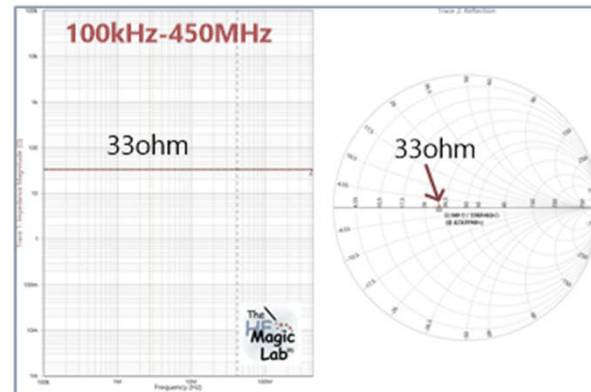
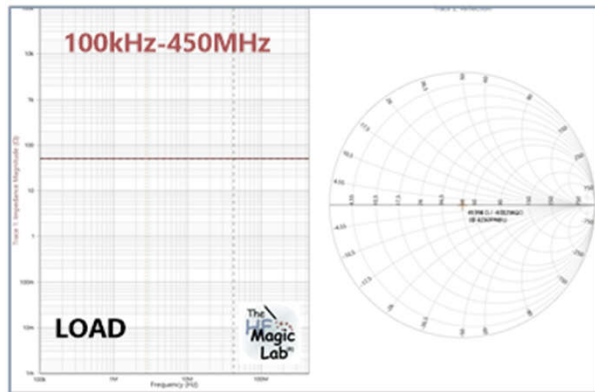


Smith Chart ... SimSmith for our demos



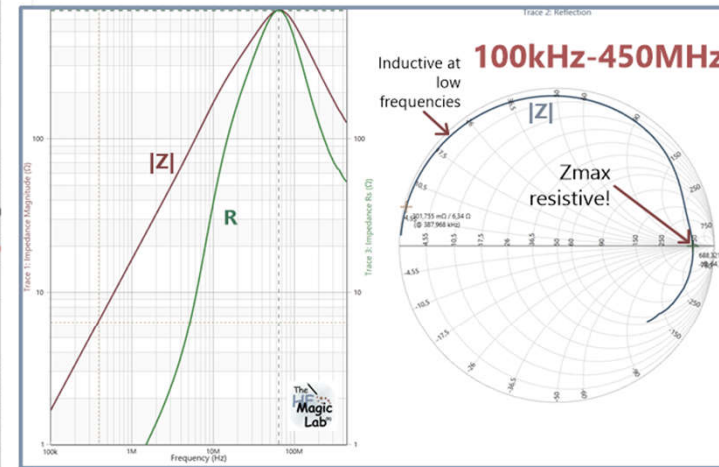
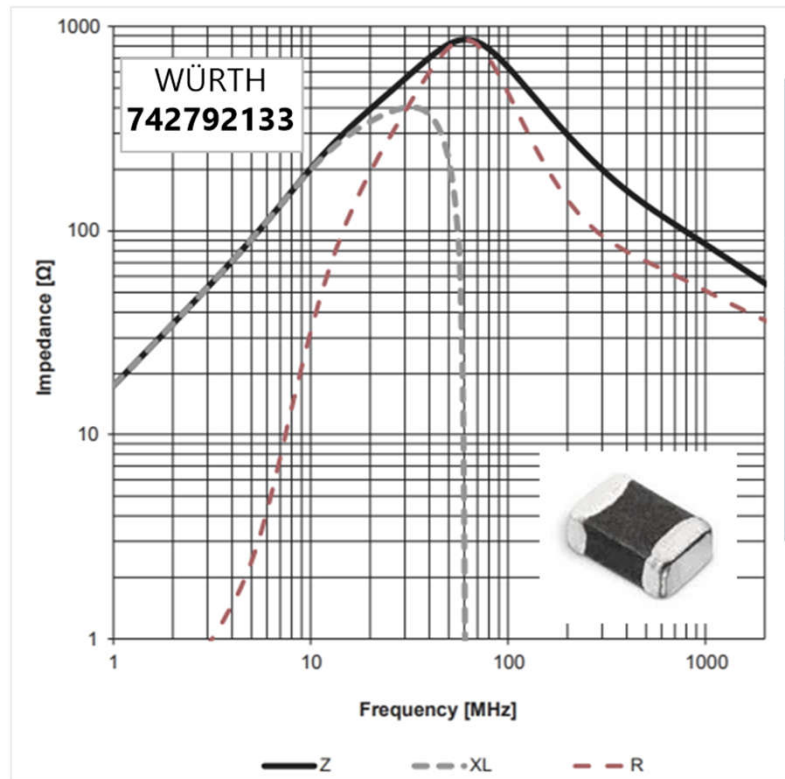


Smith Chart ... examples



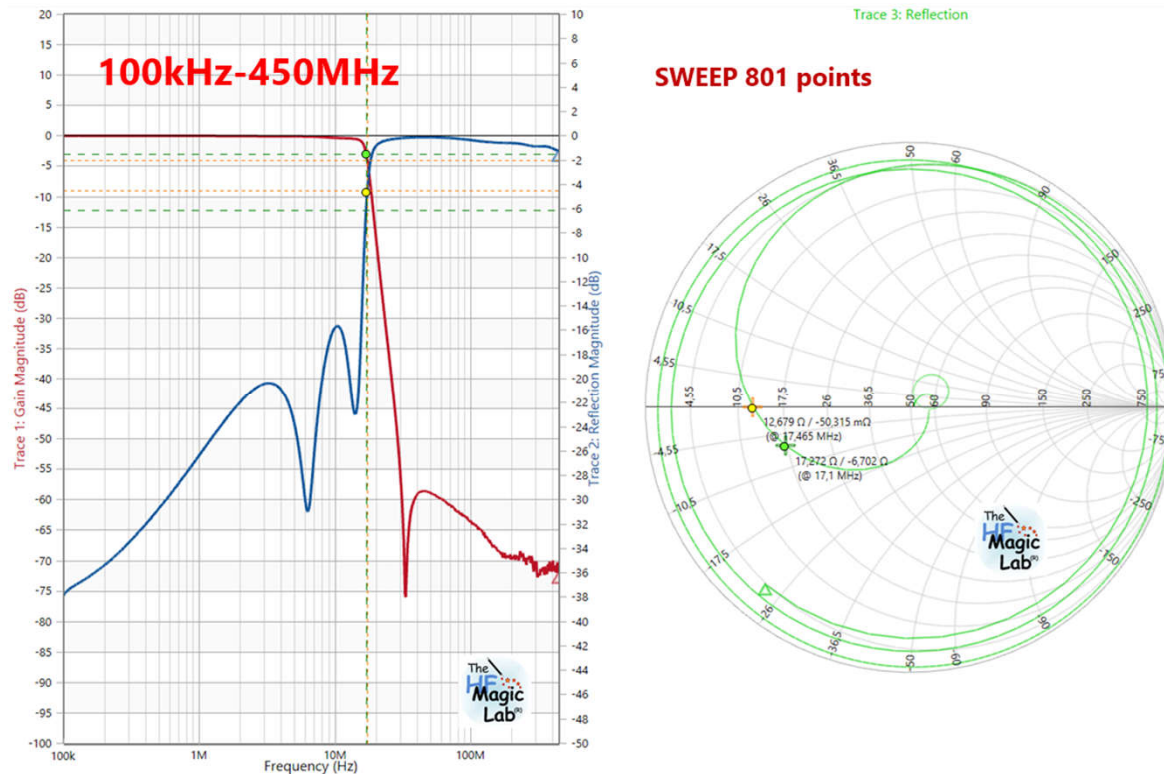


Smith Chart ... ferrite bead



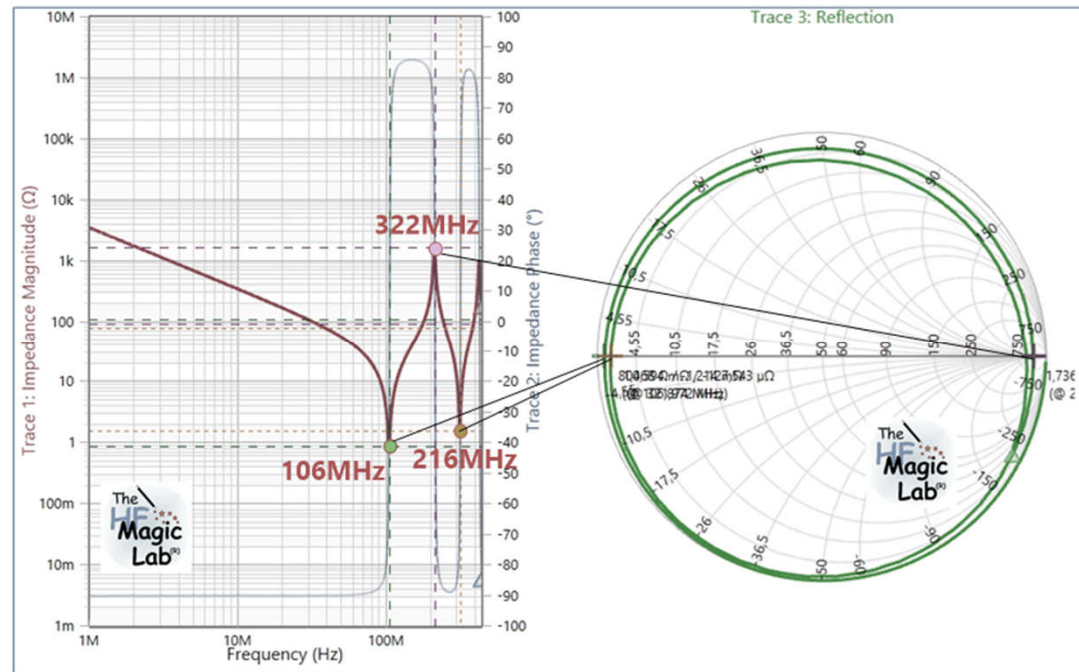
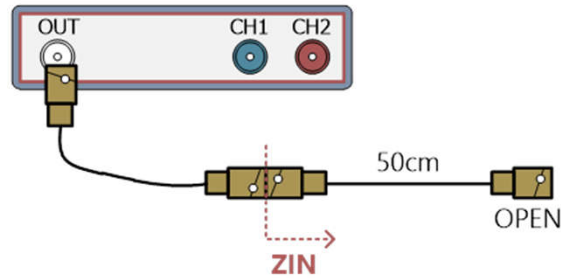


Smith Chart ... low pass filter



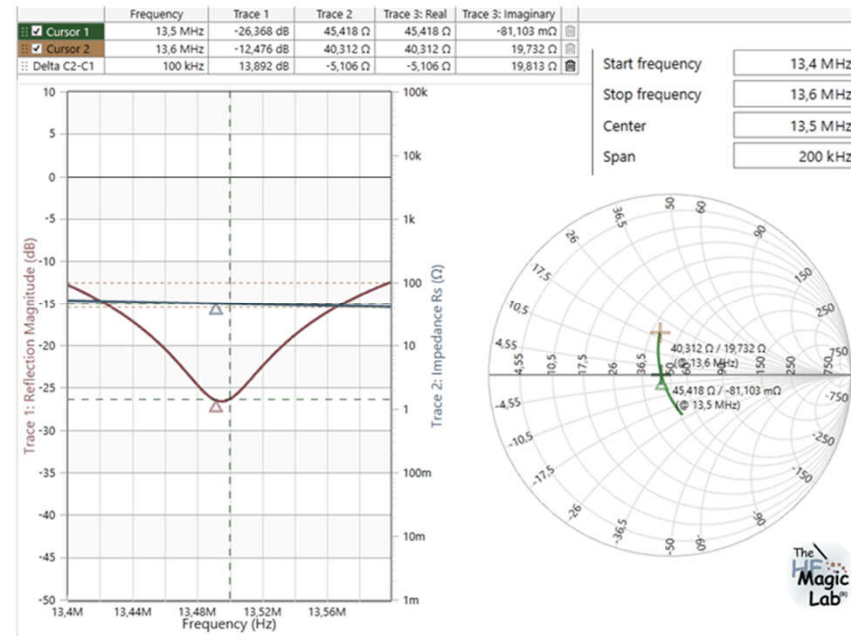
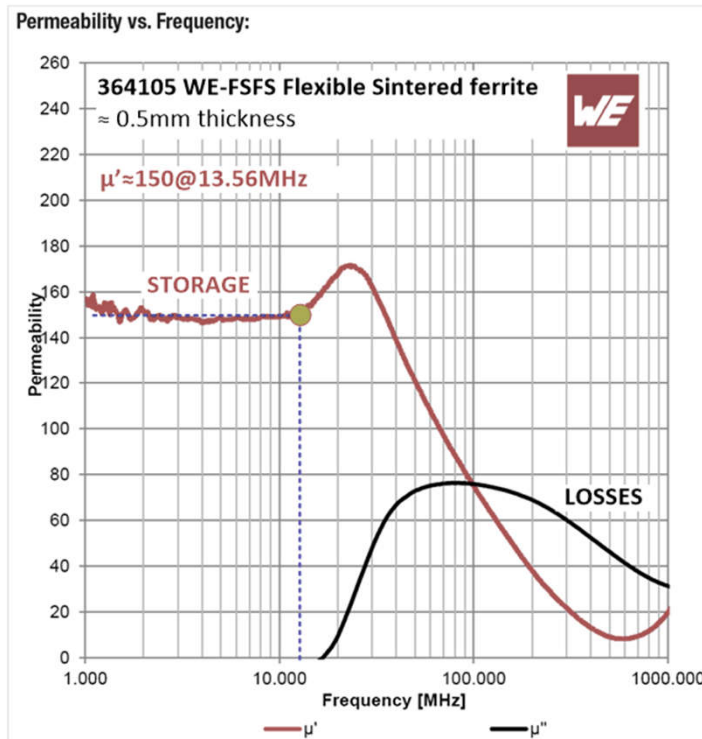


Smith Chart ... TX line





Smith Chart ... RFID match



THANK YOU!



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