



# MODELING OF BOBBIN COIL WITH FERRITE CORE

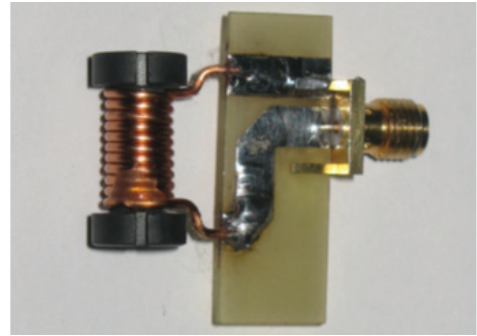
## Introduction

This application note demonstrates modeling of bobbin coil with ferrite core in EMCOS PCB VLab environment.

Dielectric and magnetic parameters of Fair-Rite 77 MnZn based material were used for modeling of bobbin ferrite core. Frequency range is from 10 kHz up to 100 MHz.

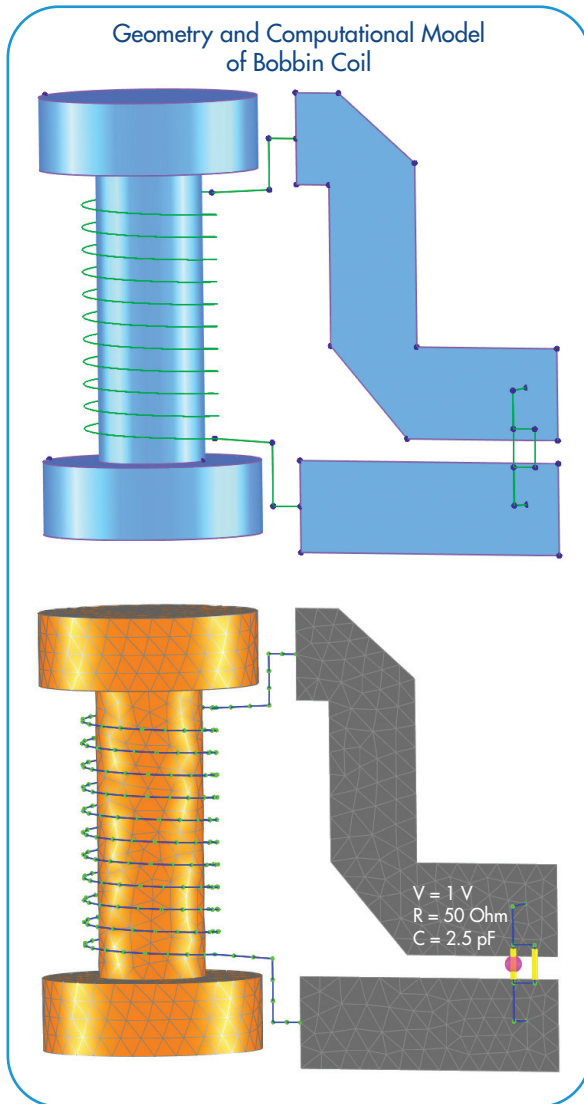
Calculated input impedance of bobbin coil is compared to measured data obtained by HP 8752 network analyzer.

Sample of Bobbin Coil with Ferrite Core

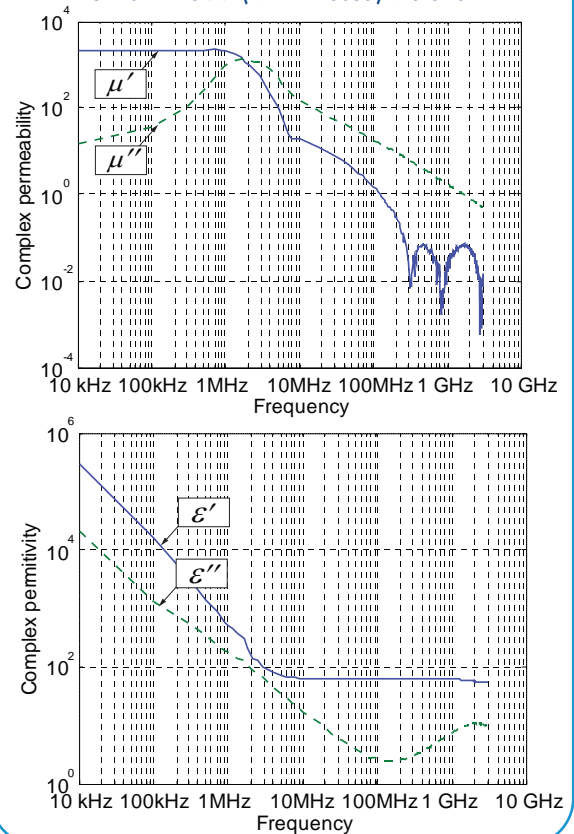


## Simulation Model Description

Geometry model of bobbin with winding was generated using special filter components construction tools.



Dielectric and Magnetic Parameters of Fair-Rite 77 (MnZn Based) Material



### Geometry Parameters

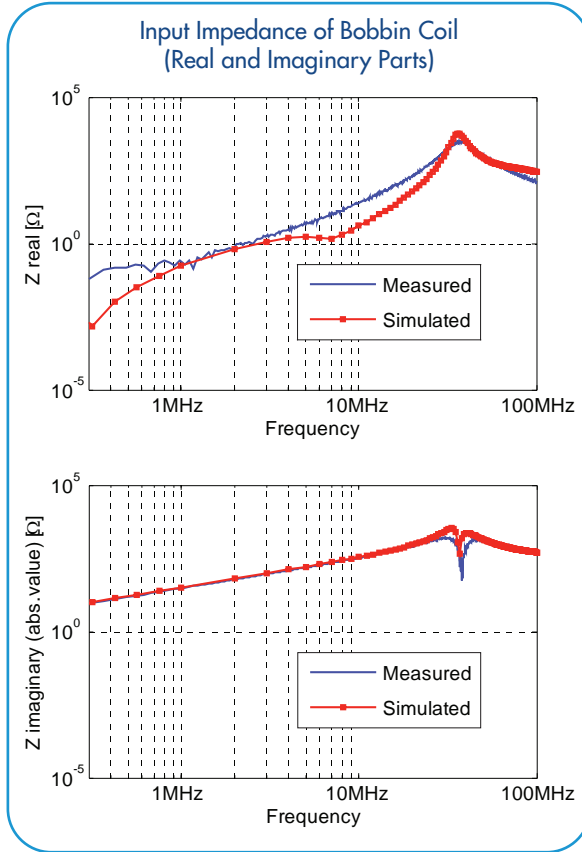
Length of bobbin core	19 mm
Spindle diameter	4.65 mm
Spindle length	12.7 mm
Flange diameter	9.55 mm
Number of turns	11
Radius of winding	0.5 mm
Distance from core to windings	0.1 mm
Orientation of winding	Left



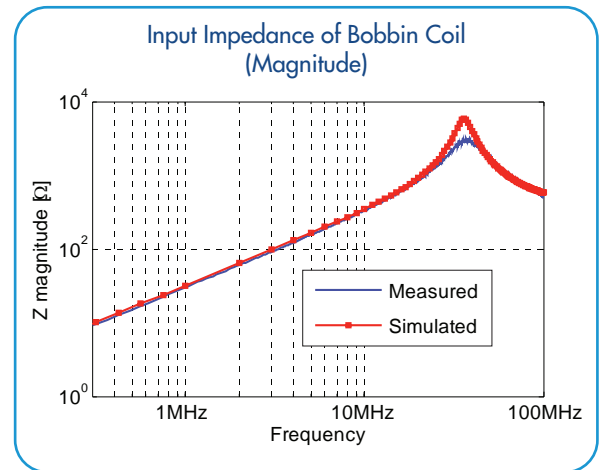
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## Results

The comparison of simulation and measurement results is shown below. There is a good agreement between simulation and measurement results in considered frequency range.



- Measurements of input impedance for bobbin coil were performed with HP 8752 network analyzer in EMCoS laboratory
- Simulations were performed with MoM based TriD solver in frequency range from 10 kHz up to 100 MHz



## Conclusions

- EMCoS PCB VLab provides convenient interface for fast generation of different filter components with various shapes of cores and windings
- Definition of dielectric and magnetic parameters of ferrite core with frequency dependent data can be easily done with help of advanced materials library supported in EMCoS PCB VLab
- The comparison shows good agreement between simulation results for input impedance of bobbin coil with ferrite core and measured data

## References

- A. Gheonjian, B. Khvitia, D. Yeremian, Z. Kutchadze, R. Jobava, X. Bunlon "FULL WAVE MOM SIMULATIONS OF EM INTERACTIONS IN EMC FILTERS FROM 10 KHZ TO 50 MHZ", 17th International Symposium on ElectroMagnetic Compatibility (CEM 2014), 1-3 July, 2014