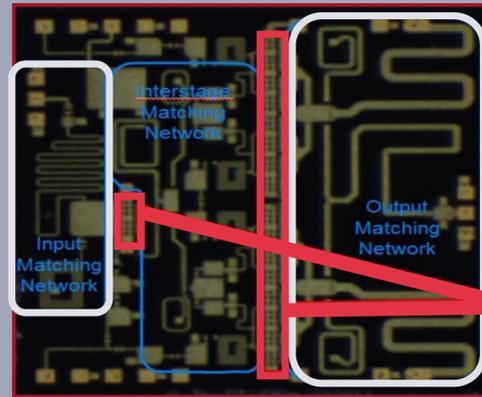


Magnetic Additive Manufacturing for Radio Frequencies

RF circuits are used in a variety of devices. Smaller circuits enable a range of applications. Passive elements take up a large footprint.



Passive Components:
Inductors, antenna, capacitors
Mostly inductors

Active Components:
Logic, computational power

Magnetic materials may help shrink passive elements.

Goal:

Investigate the feasibility of the addition of **magnetic materials** to RF boards by identifying magnetic materials and **additive processes**, then developing and running an **RF test procedure** to validate our recommendations.

Magnetic materials:

Particle inks respond to magnetic fields to boost the RF response.

Additive processes:

Add magnetic ink to circuits without damage to the components

RF test procedure:

Test ink-added boards at high frequencies to characterize response.

2016-17 Team



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Ink Addition



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RF Test Vehicle

High
Magnetic
Response

Ferrites best
meet these
requirements.

Low
Losses

Reacts
in RF
Spectrum

3D Printing

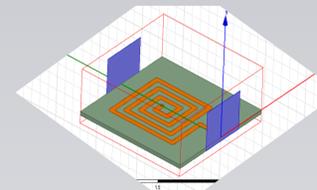


Low
Temperatures

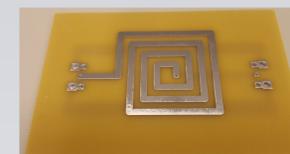
Wide
Viscosity
Range

Repeatable
Results

Spin Coating



We use ANSYS HFSS to simulate high frequencies



We create test vehicles to try out our inks



We test our vehicles in microwave frequencies using a network analyzer