



Left-Handed Non-Linear Transmission Line Device for Efficient Harmonic Generation

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a device that can generate microwaves at very high frequencies and with greater efficiency than current technologies.

Overview

Left-handed materials are artificial materials that exhibit negative permittivity and permeability when interacting with electromagnetic radiation.

The Invention

A team of UW-Madison electrical engineers has developed a device that can generate microwaves at very high frequencies and with greater efficiency than current technologies. Known as a left-handed non-linear transmission line, the device makes use of left-handed materials concepts. It is designed for use as an efficient harmonic generator; as such, it can take an input signal at a frequency of 3-4 gigahertz (GHz) and generate an output signal in the third harmonic, or 9-12 GHz, range. It is also scalable to higher frequencies.

The device can be constructed from inexpensive electronic parts that are easy to obtain, such as capacitors, inductors and varactor diodes. And along with harmonic generation, the device can be used to increase the intensity of an input signal at the same frequency (parametric amplification), or to generate an output signal of a lower frequency than the input (fractional frequency generation).

Applications

- Could be used to create microwave signals for applications such as radar, spectroscopy, global positioning systems (GPS), deep space communication and sensing

Key Benefits

- Generates microwave energy at higher frequencies and with greater efficiency than current technologies
- Produces a wider range of frequencies than other comparable circuits
- Simple to design and test
- More compact than other devices with similar capabilities
- Provides greater design flexibility, facilitating the optimization of device parameters

Additional Information

For More Information About the Inventors

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Tech Fields

- [Information Technology : Networking & telecommunications](#)

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