

INESCPORTO[®]

INSTITUTO DE ENGENHARIA DE SISTEMAS
E COMPUTADORES DO PORTO
LABORATÓRIO ASSOCIADO

Campus da FEUP
Rua Dr. Roberto Frias, 378
4200 - 465 Porto
Portugal

T +351 222 094 000

F +351 222 094 050

www@inescporto.pt

www.inescporto.pt



prime
Programa de Incentivos à
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Multiband Antenna Design Using Fractal Geometries

Qi Luo , Henrique M. Salgado, José R. Pereira

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FCT Fundação para a Ciência e a Tecnologia

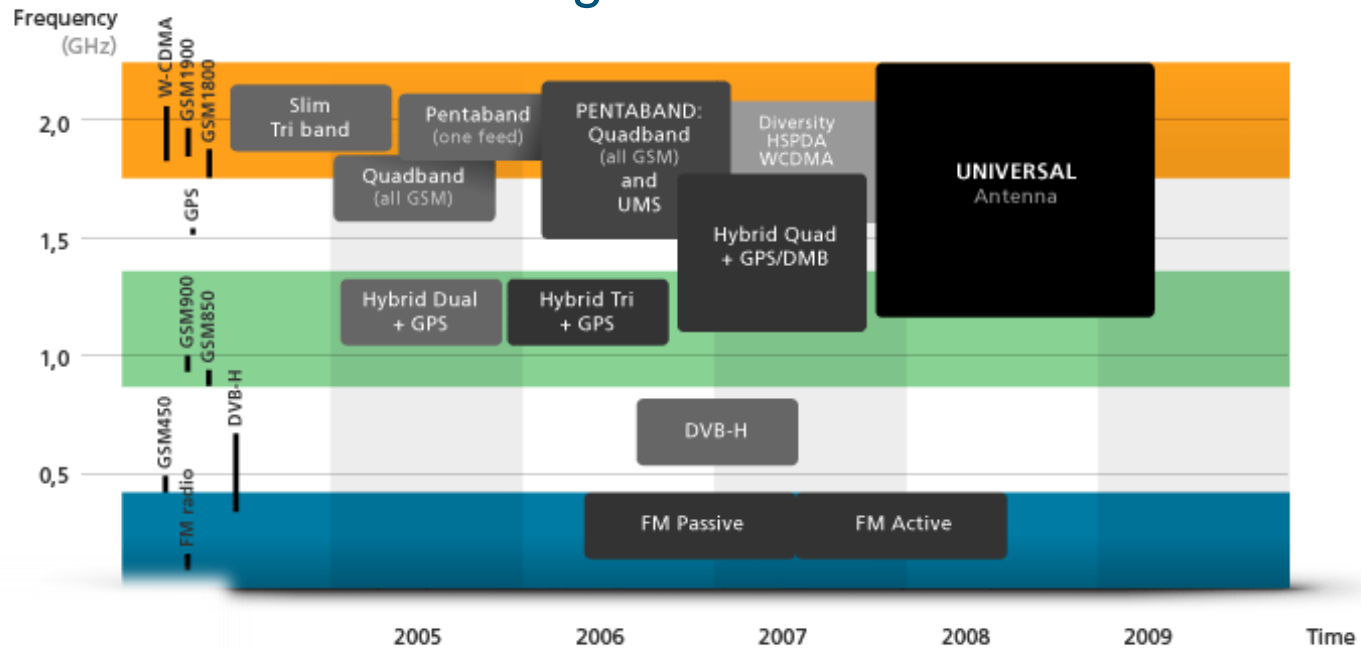
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

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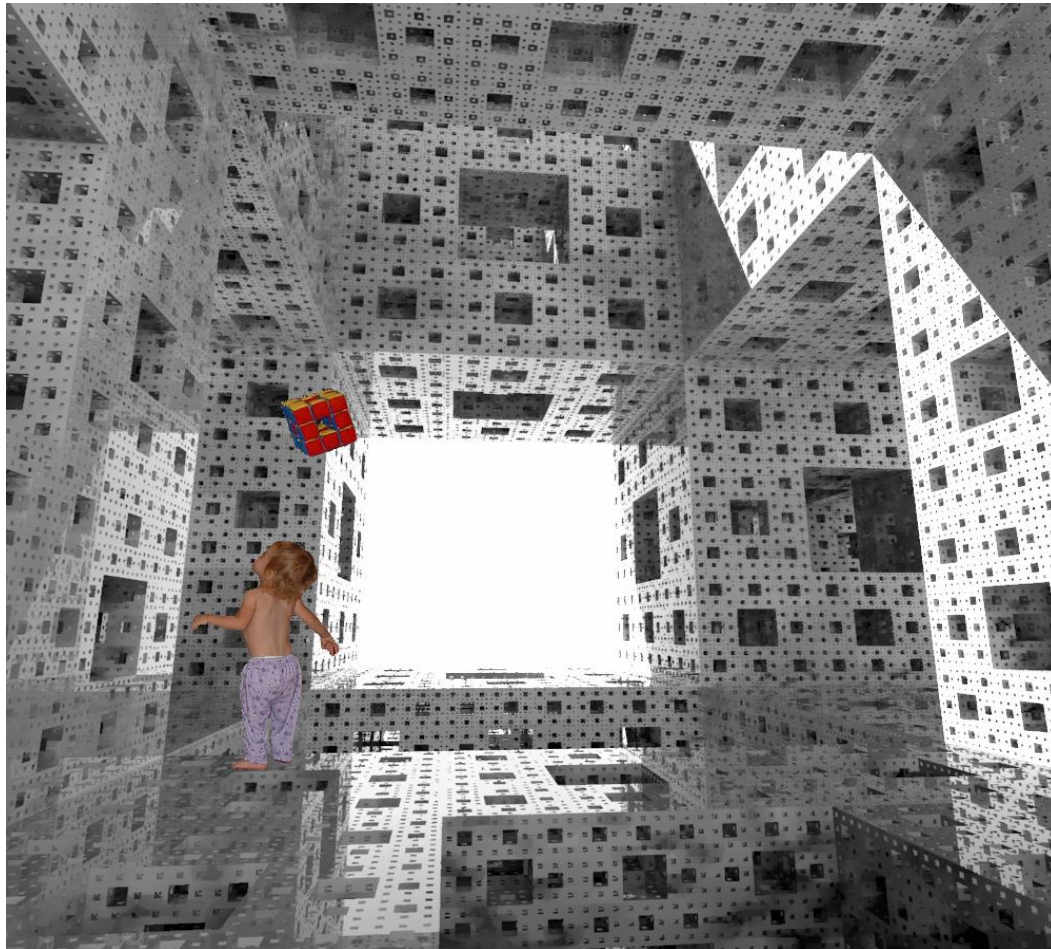
- Introduction
- Objectives
- Methods and Techniques
- Designed Fractal Antennas & Measurement Results
- Conclusions and Discussions

Introduction (1/4)

- The needs for multiband antenna for nowadays wireless communications is increasing



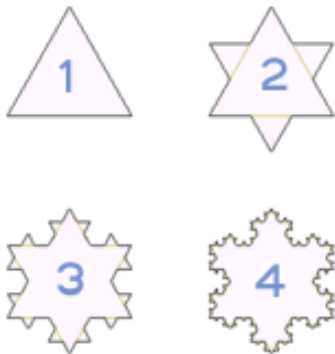
- Fractal geometry is a family of geometries that have the characteristics of inherent self similar



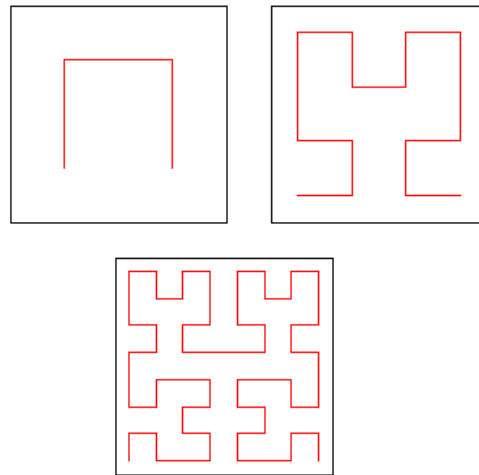
- Recently, fractal techniques have been brought to the field of antenna design
- The advantage of using fractal geometries in antenna design include:
 - ✓ Antenna miniaturization,
 - ✓ Providing multiband resonant frequencies with similar radiation characteristics

Introduction (4/4)

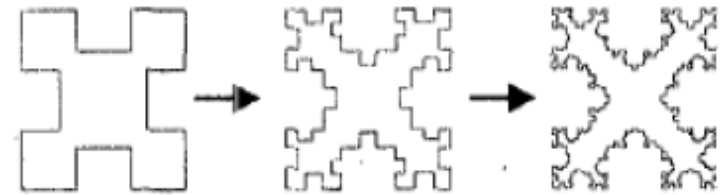
- Examples of some fractal geometries that have been used in antenna design



Koch Snowflake



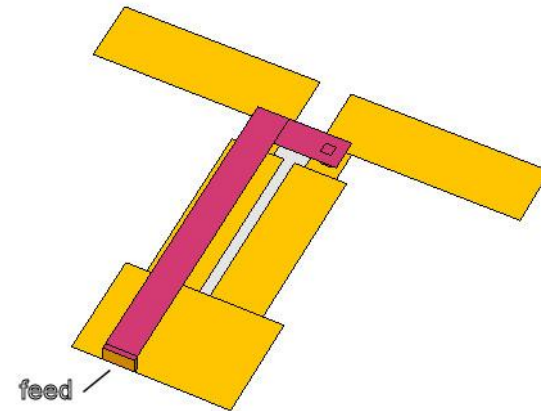
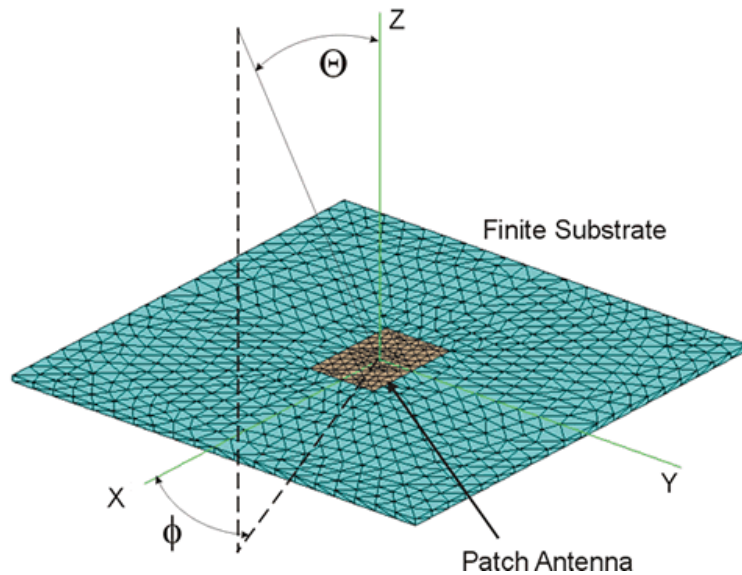
Hilbert Curve



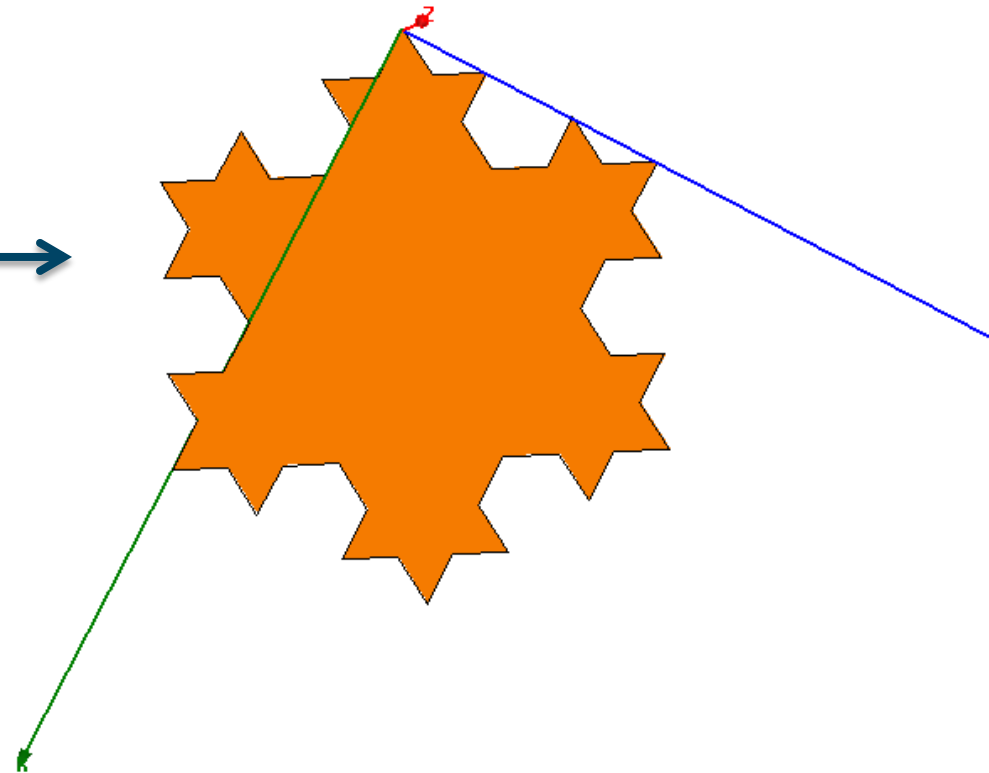
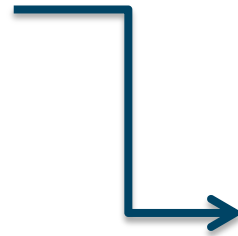
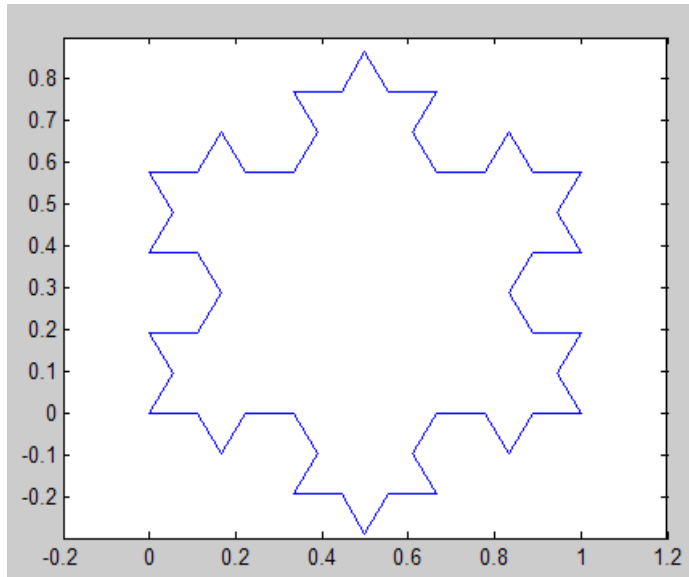
Minkowski Island

Objectives

Overall Objective: using Fractal geometries to design **Compact** dual band antenna for Wireless (e.g. WLAN) communications.



Methods and Techniques (2/2)

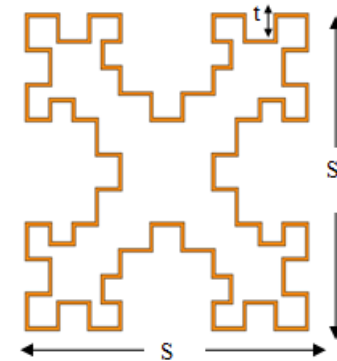
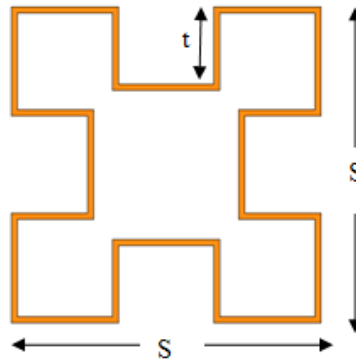


Name	Value	Unit
size	25	mm

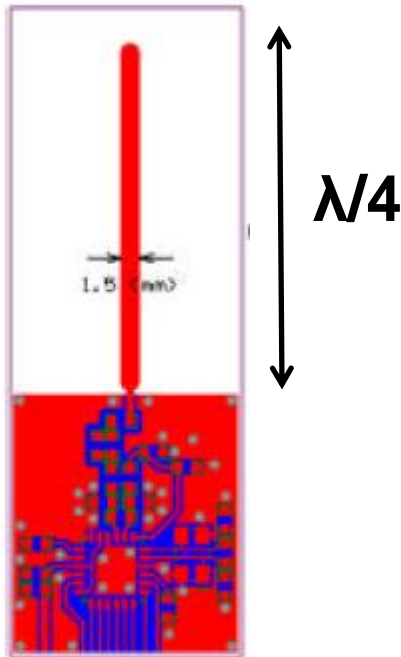
Variables

DESINGED FRACTAL ANTENNAS

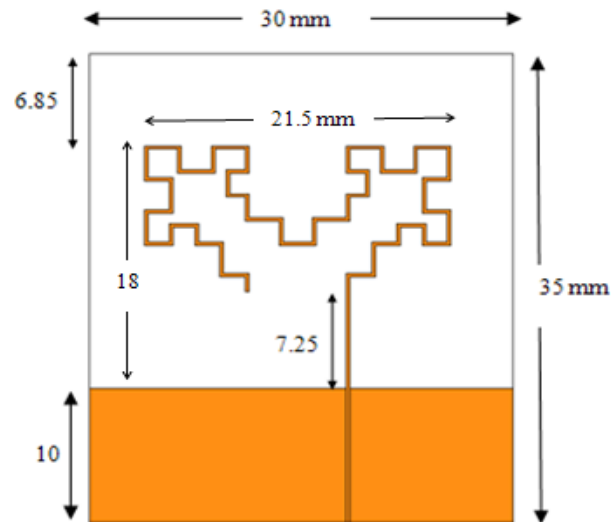
Fractal Monopole Antenna Design Using Minkowski Island Geometry



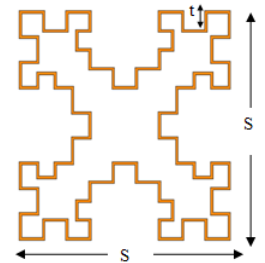
Fractal Monopole Antenna Design Using Minkowski Island Geometry



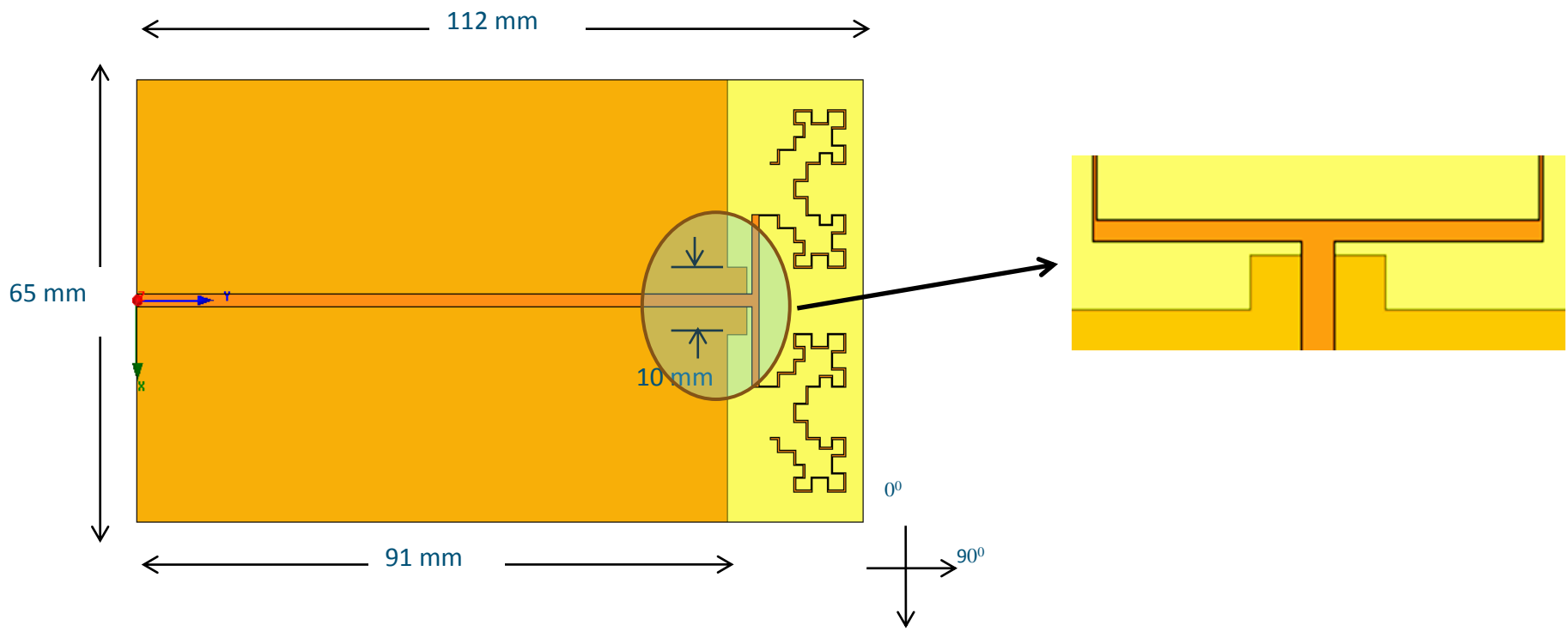
Single band



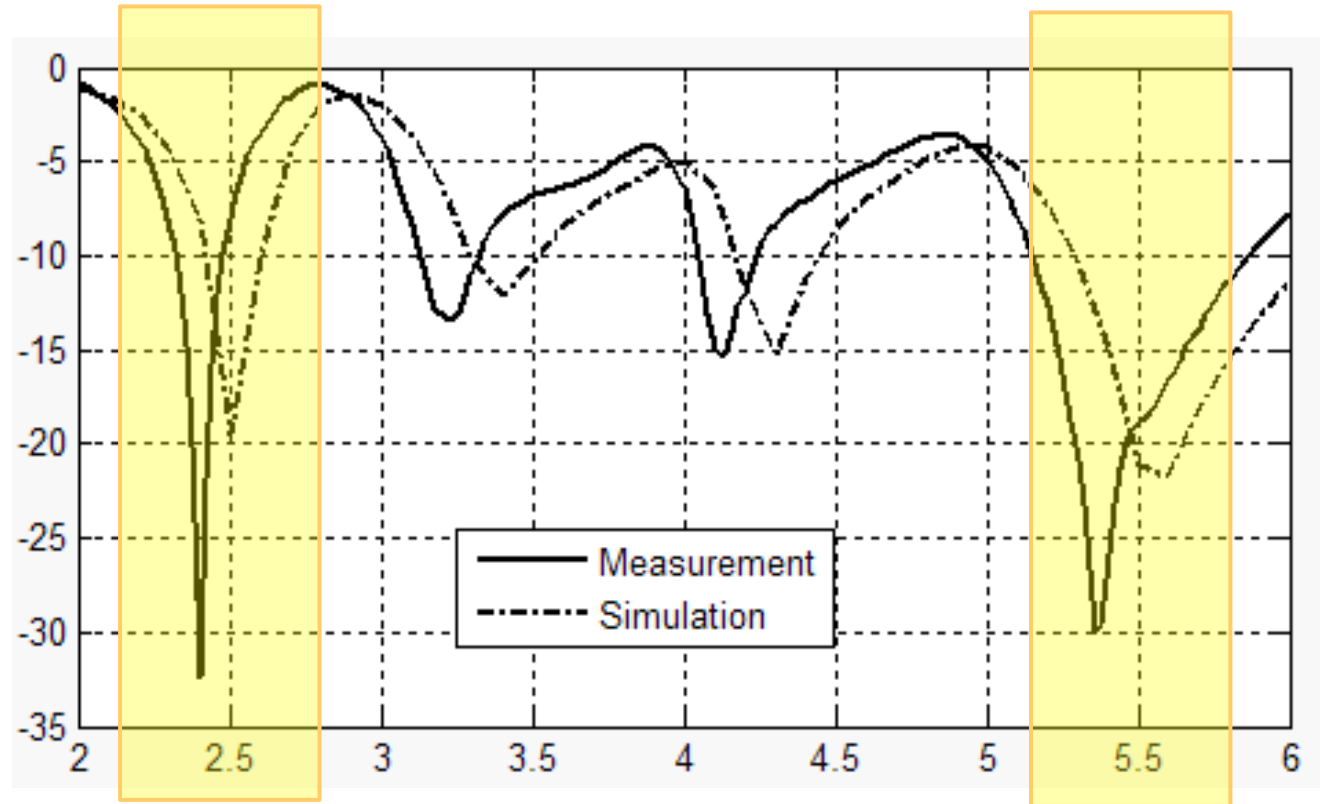
Dual band



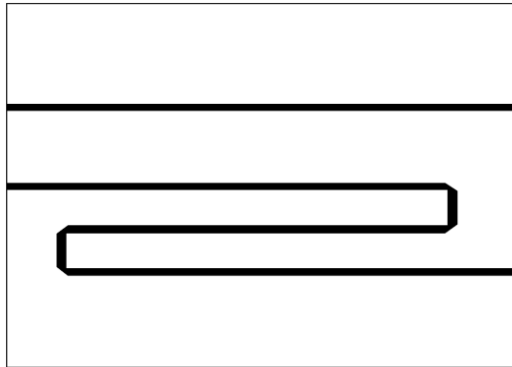
Printed Fractal Monopole Antenna Array for WLAN



Measurement Results



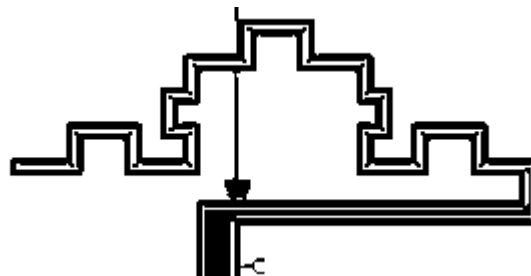
Fractal Monopole Design for WLAN USB Dongle

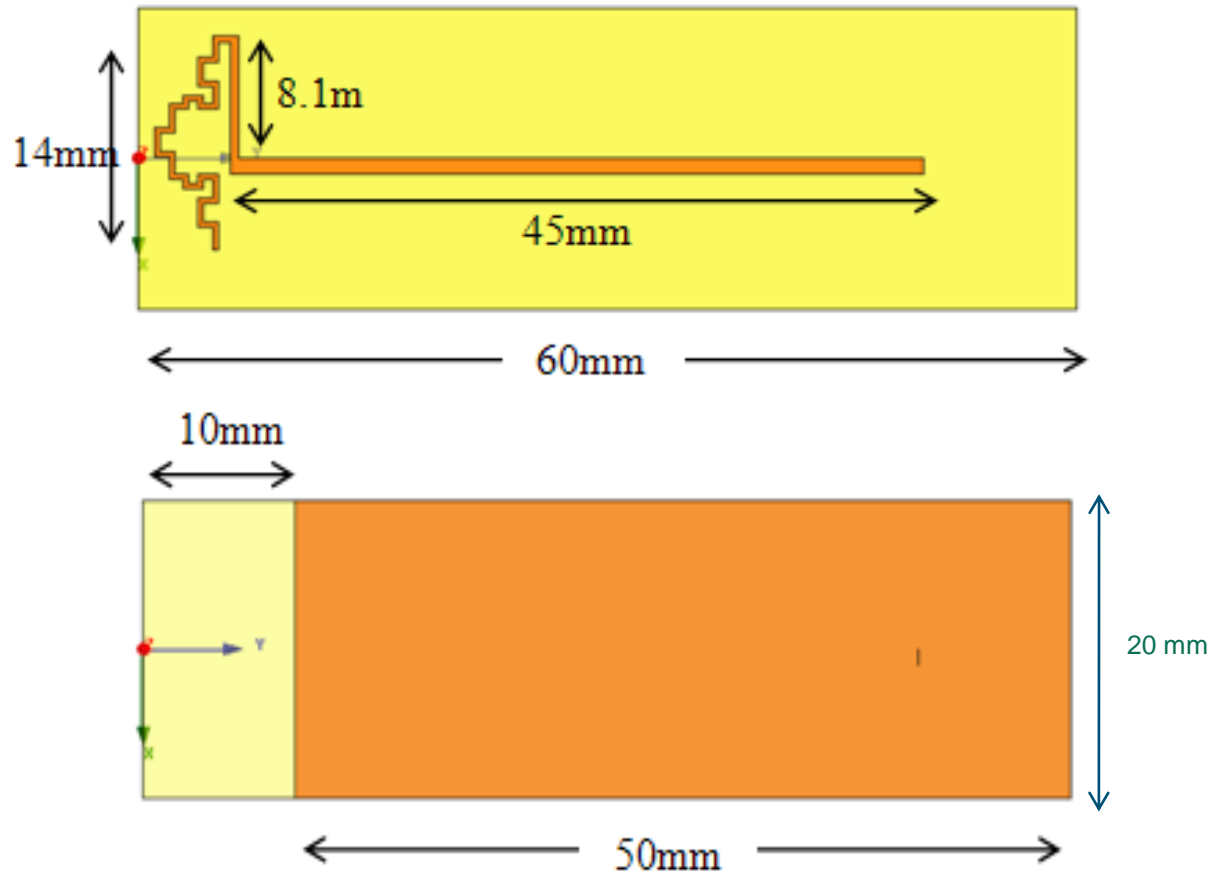


Meander Line

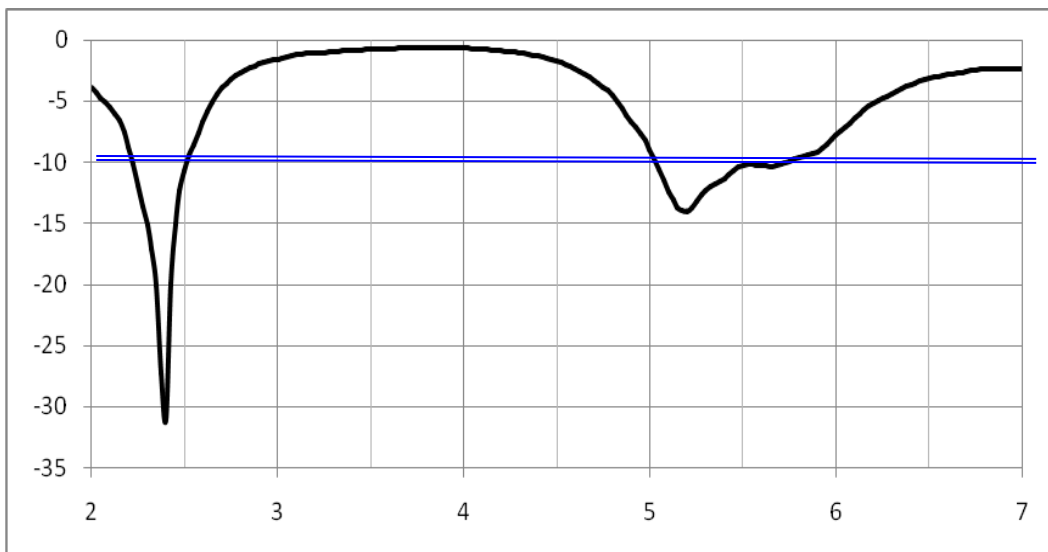


“Cohen” Fractal

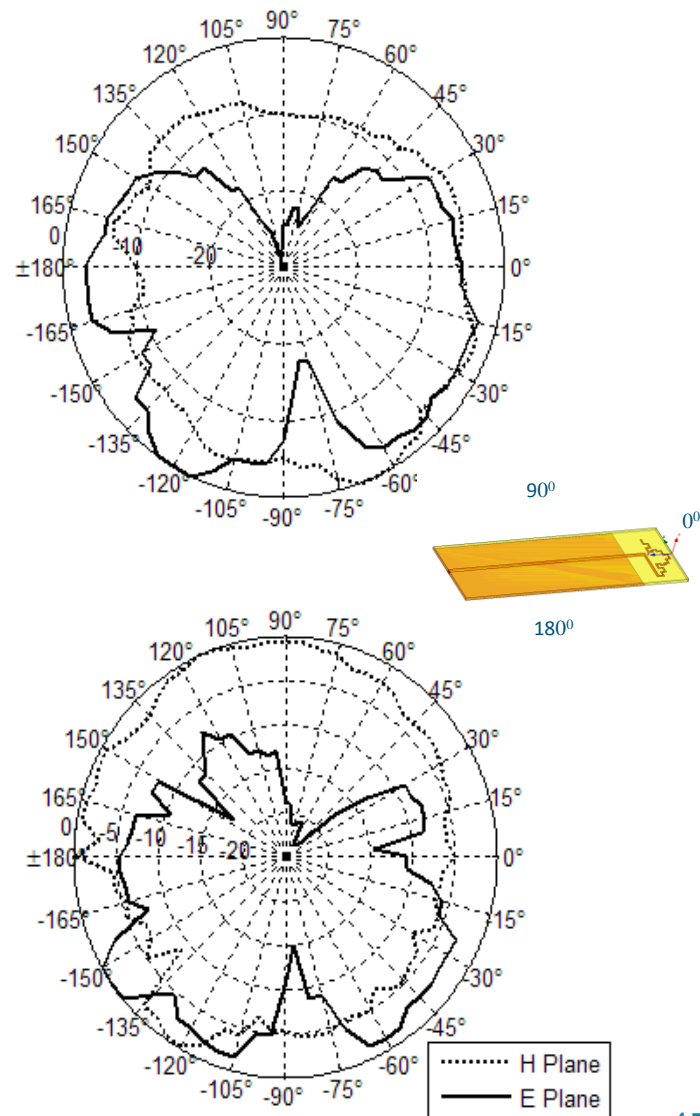




Measurement & Simulation Results



Lower band: 2.3 – 2.5 GHz
Upper band: 5.0 – 5.85 GHz



Conclusion and Discussions

- Several antenna designs using fractal geometry have been introduced
- The designed fractal antennas exhibit high radiation efficiency, good impedance match and moderate gain at desired frequency bands
- Future works will focus on designing antenna with Tunable/Reconfigurable feature, Compact MIMO antennas as well as antenna optimization

Questions ?

Thanks for Your Attentions !