IC1301 -WiPE

Wireless Power Transmission for Sustainable Electronics

High Order Modulation for Passive Backscatter Wireless Sensor Networks

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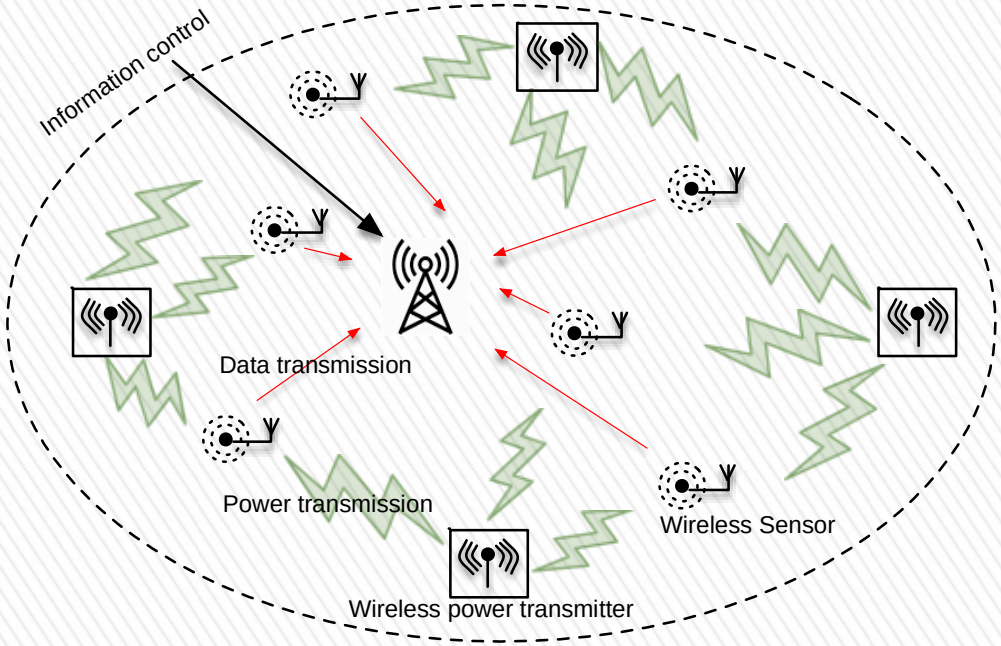
Agenda

- Introduction
- Passive Backscatter WSN with WPT capabilities
- Backscatter High Order Modulation
- Results
- Conclusion

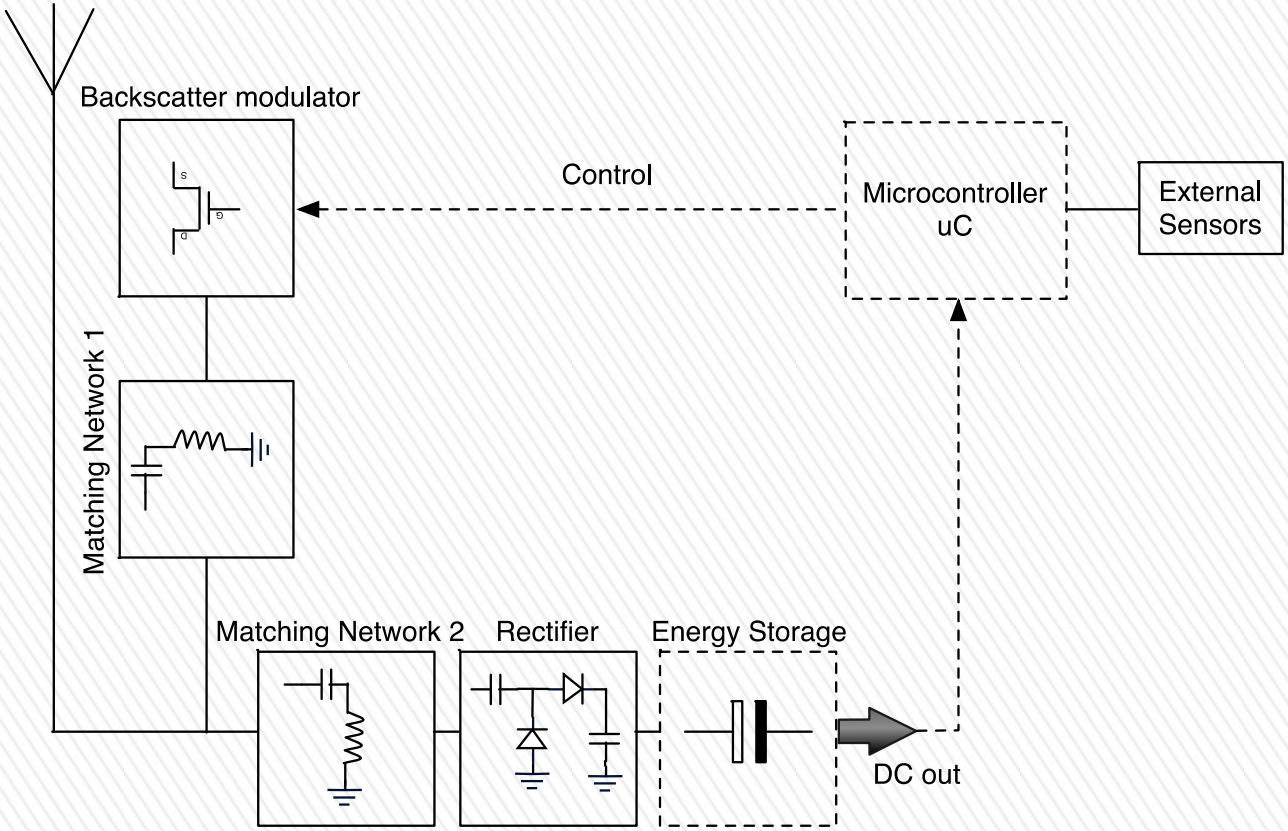
Introduction

- Potential solution for totally passive sensor networks;
- Continuous operation with large number of sensors powered by fixed wireless power transmitters;
- Sensors transfer the data for the information control;
- Two different frequencies: one for WPT and the other for the backscatter modulation.

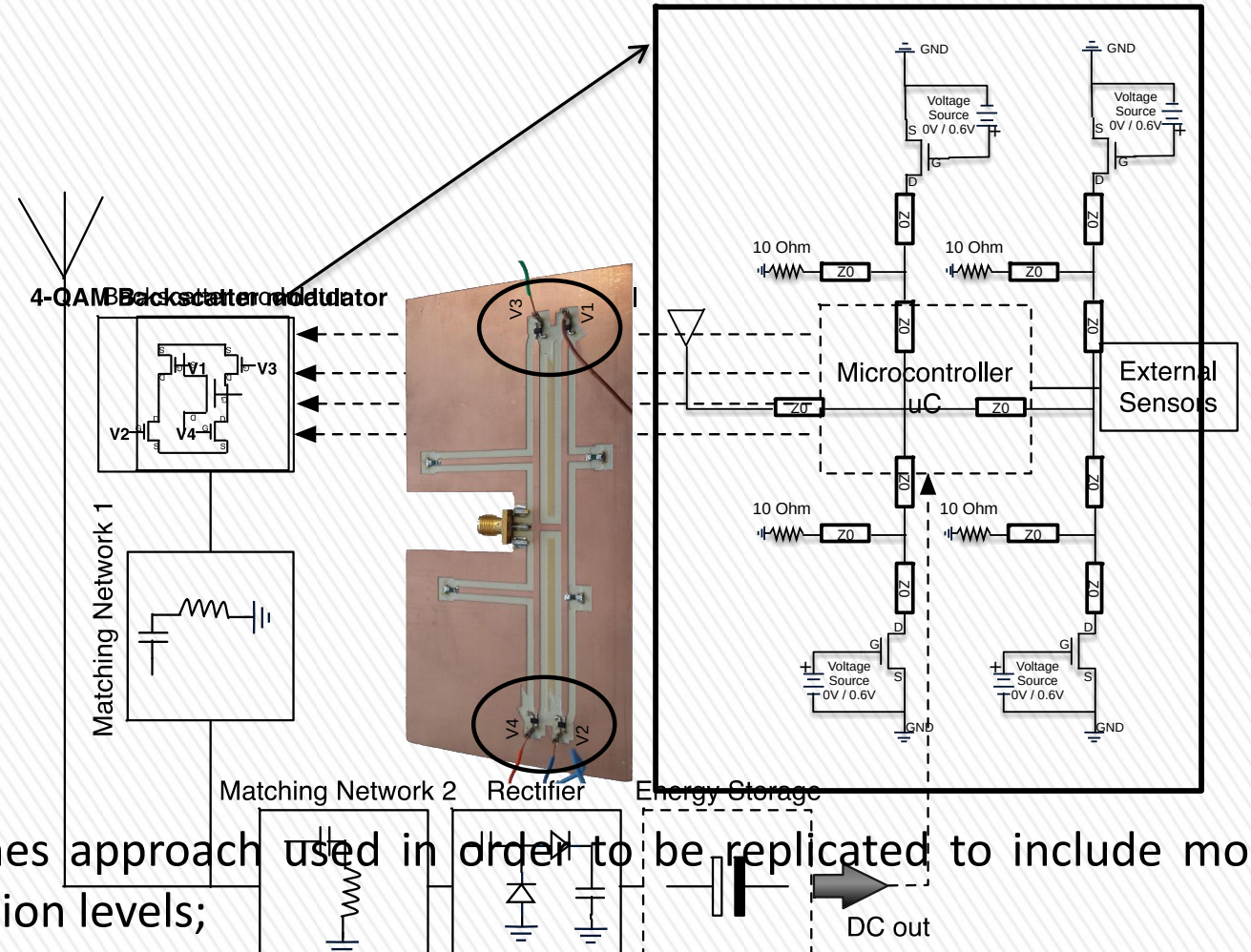


Passive Backscatter with WPT capabilities

- Designed and optimised to work in two frequencies!
- It is expected that this system can be capable of supplying the microcontroller and this modulates the information, acquired from the sensors, by controlling the transistor.



Backscatter High Order Modulation

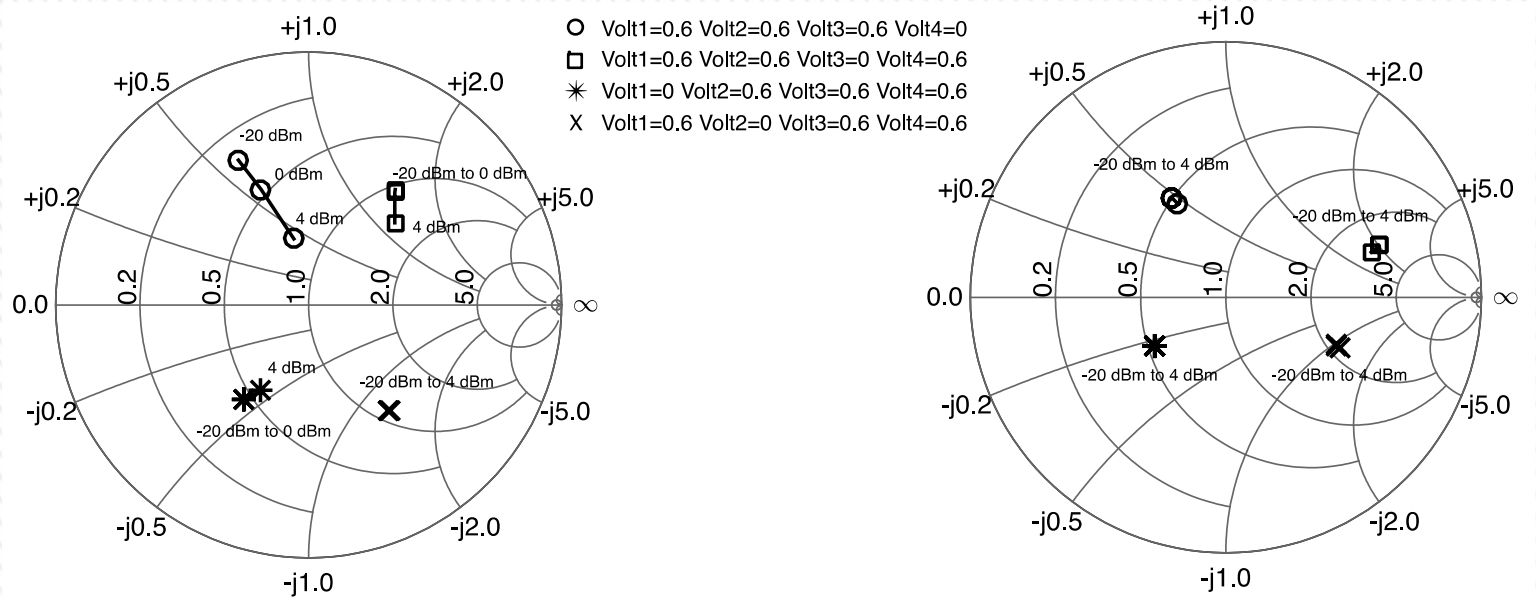


» 4 switches approach used in order to be replicated to include more modulation levels;

» Each branch is exactly equal and can be fully tuned to present the scattering parameters in the smith chart of our choice.

Results

- The design strategy was to optimize the circuit for several input powers, so that the backscatter can actually work on a variable range scheme;
- The obtained results clearly showed that the 4-QAM modulation is viable as can be seen in the smith chart.



Simulated

Measured

Conclusion

- New approach to higher order modulation backscatter radio solutions was developed;
- The solution combined with a WPT scheme can actually be used to increase bit rate in fully passive WSN and be one of the enablers of the IoT paradigm;
- From the results it was proved that this solution is clearly a potential solution for fully passive high bit rate WSNs.

Questions?

Thank you!

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