

# **Technology Transfer Opportunity**

# Digital pre-distortion for RF power amplifier for wireless communication

#### **OPPORTUNITY:**

Hardware implementation of Digital Predistorter for RF Power Amplifiers based on Dynamic Truncated Volterra Series – a simplified approach to incorporating DPD in wireless base-station PA design.

# **Description of Technology:**

An efficient open-loop digital predistorter (DPD). Derived from the dynamic deviation reduction-based Volterra series this design allows for compensation of both nonlinear distortion and memory effects induced by RF power amplifiers (PA) in wireless transmitters.

The control parameters of the predistorter can be directly extracted from an offline system identification process. This eliminates the usual requirement for a closed-loop real-time parameter adaptation, which in turn dramatically reduces the implementation complexity. Further reductions in system complexity have been achieved by applying undersampling theory in the model extraction and utilizing parameter interpolation.

Experimental results show that by utilising this technique with only a small number of parameters, nonlinear distortion induced by the PA can be significantly reduced, as evaluated by both adjacent channel power ratio reduction and normalized root mean square error improvement.

# Value Proposition:

- Significant reduction in DPD implementation complexity
- Compensates for PA non-linearity and memory effects
- DPD design that can be implemented on a single FPGA
- Control parameters can changed in memory without having to modify the DPD implementation.

#### Market:

For implementers of next generation LTE or WiMax base-stations or for those who want to get the highest efficiency out of their existing PA designs, incorporating DPD is a necessity. This technology targets both base-station implementations and PA silicon/component designers.

#### Inventors:

Dr Anding Zhu and Lei Guan of UCD School of Electrical, Electronic and Mechanical Engineering.

#### Status:

- Patent application has been filed
- Inventors are continuing to further research and expand the DPD design.
- Proof of concept demonstrator being implemented.

# **Opportunity Sought:**

License or development partner opportunity available.

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