

Title: Suppression of Coherent Transmitted Images in Reactive Channels.

Background: In addition to electrical power, electrical power lines are sometimes also used to carry signals and data allowing end-user devices and utilities to transmit data and enable devices to respond to commands. However, power line communications, such as those used in smart grid applications, may not function properly, and utilities increasingly require improved communication methods and technologies to collect data control grid operations in real time. Transmission of data via an active power line is a difficult task and may cause a number of problems in the system. These problems may include interference and other forms of noise. As unwanted signals proliferate in the channel, the availability of clear spectrum for additional communication may be drastically reduced; thus, the placement of signals to communicate information may become difficult.

Invention Description: Inventors have developed a technique and device for suppressing interference in signals carried in electrical power lines. The interference expresses itself in the combined channel as "images" produced via recursive replication of the original communication signal. These "image" signals are particularly problematic for communications scenarios. To counteract these "images," the invention uses characteristics of channel activity to predistort the communication signal prior to introduction to the channel. Pre-distortion of communication signals is not a new concept. It is used in all forms of communication. However the specific approach to pre-distortion used by the invention is completely novel, and highly effective. This approach may have immediate importance in Smart Grid implementations.

Benefits: The invention meets a critical need in the marketplace for effective and reliable communication signals and power quality in Smart Grids as well as traditional power lines. The inventors have demonstrated the improvements achieved through this technique in power lines communication. The improvements will advance the quality of communication between devices in Smart Grids, as well as the power quality in power lines through the suppression of interference.

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