



Improved Non-coherent Ultra Wideband Radio Receiver

IP Status: Issued US Patent; **Application #:** 11/669,938

Ultra Wideband Radio: Coherent vs Non-coherent

Ultra wideband radio (UWB) receivers often use coherent architectures, which require estimation of a radio frequency (RF) carrier signal and the channel response. Synchronization error between incoming signal and template, distorted template signal, or noise in template signal degrade the performance of a coherent receiver. Non-coherent architectures use extremely short duration pulses that are transmitted at very low powers. In comparison to coherent receivers, they are not subject to the same signal degradation due to the short duration signals and can operate at much lower power. Non-coherent receivers are limited by processing-intensive algorithms, such as channel estimation, that try to separate signals from background noise.

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Improved Non-coherent UWB Detection

Researchers at the University of Minnesota have developed an improved method of non-coherent detection for UWB receivers with a simplified detection architecture with significantly reduced power requirements. This allows the use of CMOS architecture without tunnel diodes and creates a non-intensive process that can be cheaply produced and operated. This opens up applications in indoor location awareness, cognitive radio and UWB radio in general.

FEATURES AND BENEFITS OF IMPROVED NON-COHERENT ULTRA WIDEBAND RADIO:

- Results in lower power consumption and low cost design with no performance degradation
- Uses non-coherent detector , which greatly simplifies signal processing
- No complex channel estimation algorithm
- Uses existing CMOS processes rather than tunnel diode add-ons
- Applications in indoor location awareness, cognitive radio and UWB radio in general

Researchers: Ramesh Harjani, PhD, Professor, Department of Electrical and Computer Engineering, School of Science and Engineering Dr. Harjani's interests are RF/Analog circuits for wireless

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