Enhanced Wireless Receiver
CHALLENGE AND BREAKTHROUGHS

• More energy is required to transmit to users suffering from poor channel quality and/or interference.
• Two critical receiver functions, equalization and synchronization, perform poorly when signal quality is low and signal is not clearly differentiated from noise.
• Key innovation is a redesigned receiver structure that operates better with lower signal quality.
• Reduces both base station energy consumption and interference onto neighboring cells.

A New Receiver Design Specifically for Users Requiring the Most Energy
Enhanced Wireless Receiver for Poor Channel Quality and Interference

KEY ACCOMPLISHMENT AND RESULTS

• New receiver has an iterative decoder for channel estimation/equalization and a residual phase estimator
• Enables low SINR synchronization and data recovery and more reliable frequency synchronization
• Resulting in ~1dB performance gain over conventional receiver at lower SINRs
• Users with low signal quality have a more reliable mobile experience as well as higher data rates

New Receiver Design Provides ~9% of Energy Savings versus Conventional Receivers
Enhanced Wireless Receiver for Poor Channel Quality and Interference

DEMO DESCRIPTION

• Two Universal Software Radio Peripheral (USRP) boards are connected to two laptops
• Data packets are sent wirelessly between the transmitter (Tx) and receiver (Rx)
• A low transmit power creates a low signal quality at the receiver to simulate a poor performing mobile user
• Receiver performance and energy impact estimated for different environments

USRP Boards Experimentally Validate the New Receiver Technology and Design