

OFDM Pulse-Shaped Waveforms for Dynamic Spectrum Access Networks

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BACKGROUND:

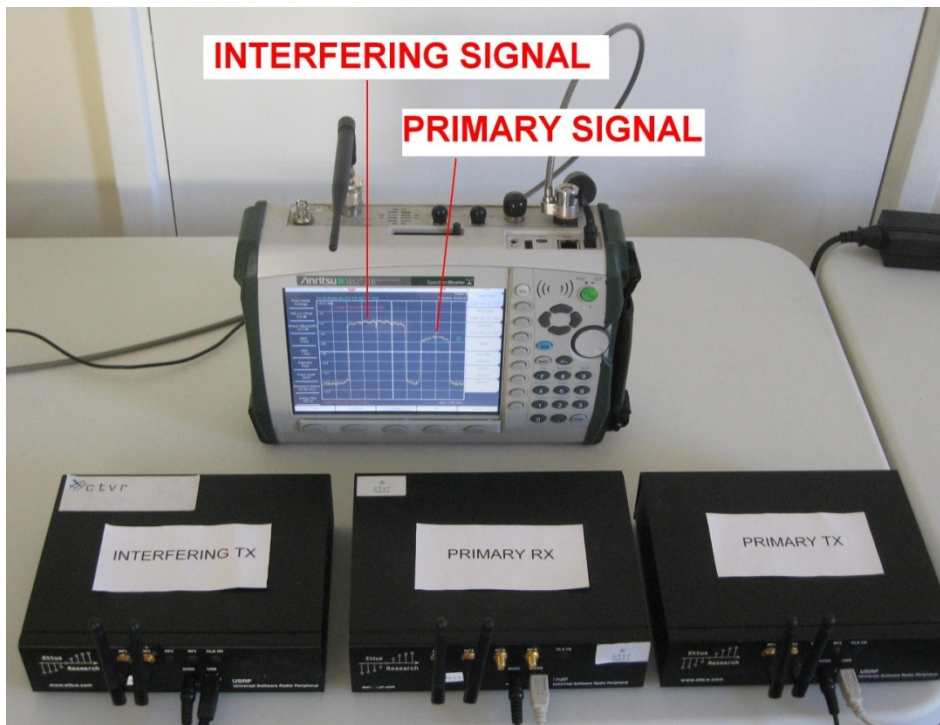
- OFDM is the modulation scheme preferred in many wireless communication systems (DSA networks, DVB, ISDB, variants of Wifi, Wimax, LTE, LTE-advanced ...)
- OFDM has flexibility to support adaptive bit/power loading, embedded signatures, non-contiguous transmissions, and **pulse shaping**

DEMO:

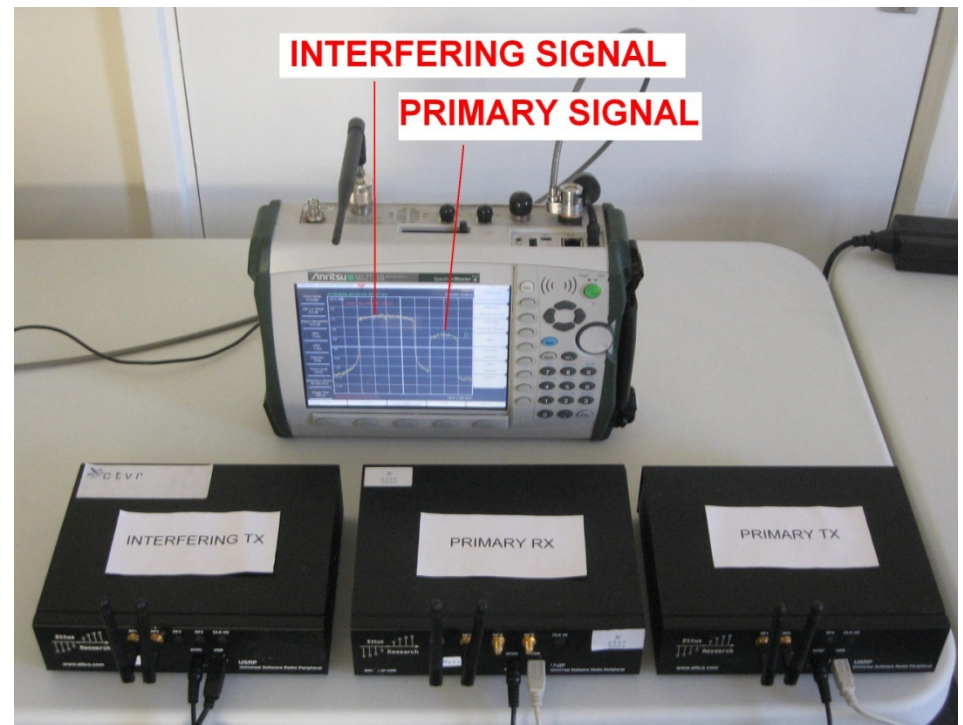
- GOAL: Suppressing out-of-band radiation of an OFDM signal through shaping
 - for coexistence of more signals in a limited frequency band
- SCENARIO: A high-power OFDM-based secondary transmission at a frequency adjacent to an OFDM-based primary system
 - Secondary Tx is positioned next to the primary Rx
 - Baseband Tx/Rx chains run on our highly reconfigurable Iris 2.0 software radio platform. USRP is the RF front-end
 - Primary system transmits audio over air
 - Primary RX *cannot receive and play audio* due to adjacent channel interference, when secondary Tx applies *no shaping*

PAPERS in DySPAN 2010: **1)** “Experiences from the Iris Testbed in Cognitive Radio and Dynamic Spectrum Access Experimentation” – Thu, 14:15-15:45, Room: Ocean 1 , **2)** “Dynamic Block-Edge Masks (BEMs) for Dynamic Spectrum Emission Masks (SEMs)” – Thu, 14:15-15:45, Room: Ocean 3

- SETUP: 3 pairs of “1 Laptop+1 USRP” for interfering Tx, primary Tx and primary Rx
 - Laptops run baseband TX and RX chains implemented on Iris 2.0
 - Baseband samples transferred to/received from USRP over USB
 - USRP transmits/receives signal over air



Suppression of adjacent channel interference through shaping



No shaping → Harmful adjacent interference, no audio

SHAPING



NO SHAPING

