Researchers at the University of South Florida have developed a new windowing method for efficient spectral shaping in orthogonal frequency division multiplexing (OFDM) based systems.

OFDM suffers from high side lobes, which results in adjacent channel interference (ACI). Conventional side-lobe suppression techniques mainly offer trade-offs between the high spectrum efficiency, low computational complexity, and high suppression. However, these conditions are critically important for communication systems at the same time. Our researchers have shown that by allowing tolerable interference, the spectrum efficiency of OFDM signals still can be increased without introducing additional computational complexity.

Unlike conventional windowing techniques where all the subcarriers within an OFDM symbol are applied to the time window, our technique utilizes only a set of subcarriers located at the edge of the band for windowing. While the size of the cyclic extensions for the non-windowed subcarriers remains, the sizes of the cyclic extensions for the windowed subcarriers are reduced. Therefore achieving both spectrum efficiency and side lobe suppression.

By exploiting the scheduling features of OFDM and dependency of channel dispersive characteristics to distance between receiver and the transmitter, the method developed by our researchers fully benefits from the spectral efficiency, throughput, complexity and suppression at the same time.

This technology would greatly benefit the communications industry.

**ADVANTAGES:**
- Does not require external windowing
- Inter-symbol-interference is eliminated
- Side lobe suppression is increased

**Increased Spectrum Efficiency & Throughput Using Edge Windowed OFDM**

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