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Tech

Rice University's WATCH transmits data in TV white spaces without disturbing active broadcasts

by Nicole Blanchard | Jul 15, 2015 2:14pm

Researchers at Rice University have successfully demonstrated a system that can transmit wireless data over television white space (TVWS) during active broadcasts. The technology, called WATCH (Wi-Fi in Active TV Channels), is the first to transmit over ultra-high frequency (UHF) channels during normal TV activity, according to a university press release.

Rice researchers used WARP, the wireless open-access research platform, to build the first system that allows wireless data transmissions over UHF channels during active TV broadcasts. *Source: Jeff Fitlow/Rice University*

The system uses a two-part technology. First, WATCH monitors TV broadcasts on UHF spectrum, using signal-cancelling technology to transmit wireless data over an unused channel without interference. The second aspect would require TVs, smart remotes or apps that relay to WATCH when a TV is being tuned to UHF channels. This reporting feature would allow WATCH to move its data transmission to another channel in the UHF spectrum. Researchers claim WATCH could "significantly expand the reach of so-called 'super Wi-Fi' networks in urban areas" if the technology is incorporated in future TVs and remotes.

"Due to the popularity of cable, satellite and Internet TV, the UHF spectrum is one of the most underutilized portions of the wireless spectrum in the United States," lead researcher Edward Knightly said in the release. "That's a bitter irony because the demand for mobile data services is expected to grow tenfold in the next five years, and the UHF band is perfectly suited for wireless data."

WATCH researchers said the system would be especially helpful for transmitting wireless data in crowded urban areas. Transmission over UHF spectrum would be especially advantageous because the system allows for transmission through buildings and other obstructions over larger area and at lower cost than other wireless options.

In cities like Houston, where the Rice team conducted its research, most of the UHF spectrum is already claimed by TV broadcasters (who, according to FCC rules, have preferential access to the space). However, the spoken-for spectrum often goes unused, according to Knightly. He said sharing with WATCH would cause only imperceptible changes in UHF channels, with televisions taking a fraction of a second longer to tune UHF channels during research tests.

"Allowing the UHF spectrum to be inefficiently used makes little sense today and will make even less sense in the future," Knightly said in the release. "There are already more people in the United States who require mobile data services than there are people using broadcast-only TV. By showing that these two communities can coexist, we hope to spur innovation and a public debate about how this valuable resource could be used."

Knightly. *Source: Jeff Fitlow/Rice University*

This isn't Rice's first foray into the UHF space. In 2014, Knightly and grad students Narendra Anand and Ryan Guerra tested a multiuser MIMO that allowed multiple users to access the same TVWS channel at the same time with increased data transmission rates.

Earlier this year, the Seattle Center announced a pilot in partnership with Microsoft which would use TVWS to allow Seattle Center visitors to transmit data more quickly during Center events. Despite researchers' claims that TV broadcasts would go unaffected, the National Association of Broadcasters (NAB) filed an emergency petition to the FCC in March claiming that white space-monitoring databases were riddled with inaccuracies, making it risky to transmit wireless data over UHF channels.

For more:

- see Rice University's [release](#)

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