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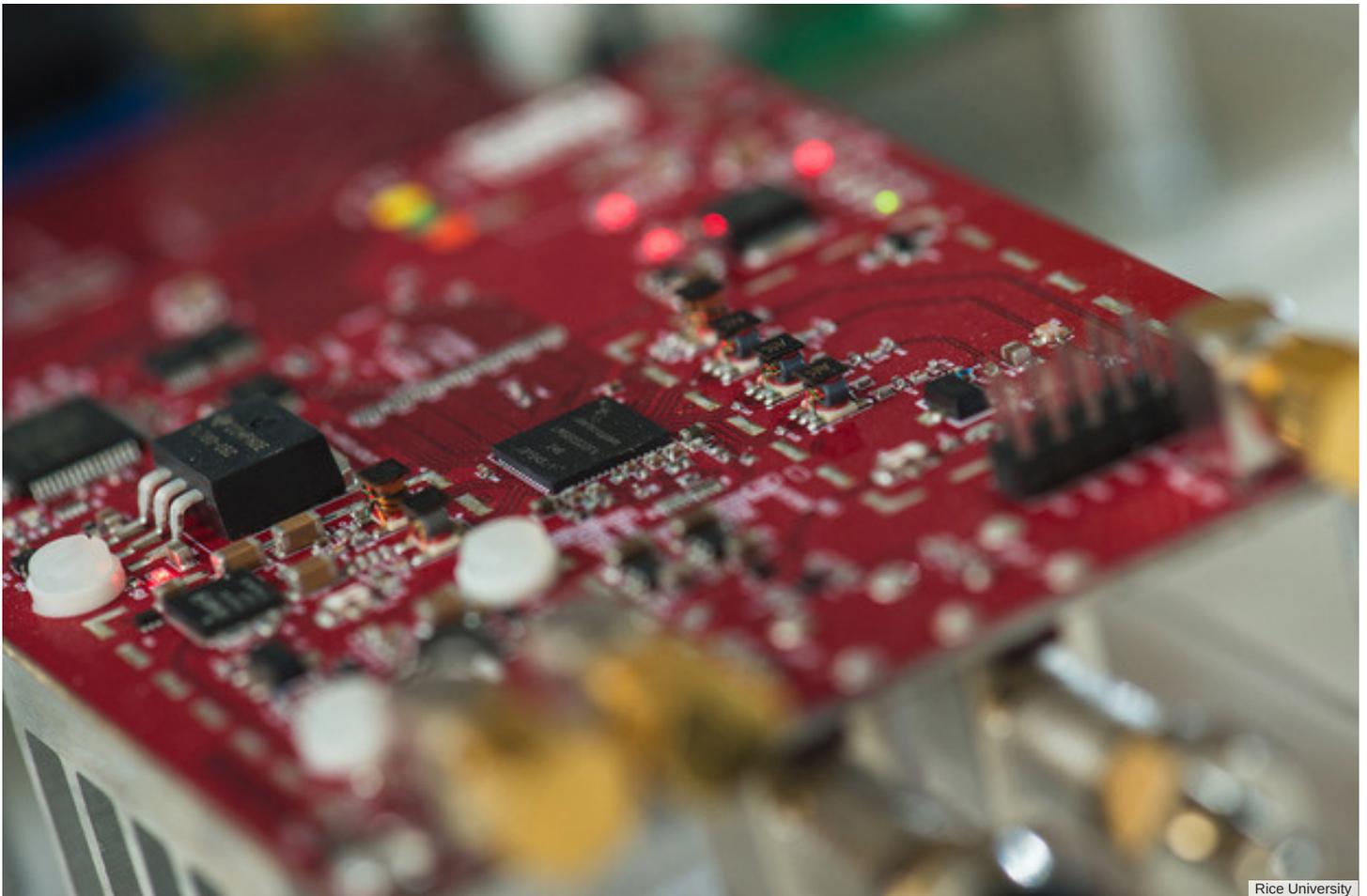
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### OPINION

## How new 'white space' rules could lead to an urban super-Wi-Fi

The underutilized UHF band is perfect for wireless data and can carry for miles, not blocked by walls or trees, researchers at Rice University say. And they have the test to prove it.



Earlier this month, the Federal Communications Commission adopted rules for unlicensed services in TV and 600 MHz bands — a.k.a. television's "white space." The new rules, as [described](#) by the FCC, "will permit unlicensed fixed and personal/portable white space devices and unlicensed wireless microphones to use channels in the 600 MHz and television broadcast bands."

Television and other licensed services — patient-monitoring devices, for example — will be protected from harmful interference.

It must be noted, though, that these licensed users, a category that includes a hospital's neonatal care unit,

have voiced fears that interference won't be protected.

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These very valid concerns aside — and we will revisit them — the rules do open up a new aspect of broadband and mobile connectivity.

## A second life for buffer channels

First, though, a primer for those who still associate white space with 1970s-era television.

White space, or buffer channels, refers to the unused channels between the VHF and UHF spectrum. In the pre-cable era, when over-the-air broadcasts ruled the day, these buffers were used to prevent broadcasters from interfering with one another. We all know how prevalent over-the-air broadcasting is now; today this spectrum is largely unused.

Or is it?

As Commissioner Jessica Rosenworcel [noted](#) in her own comments after the rules were passed, the universe of products that use this spectrum is surprisingly large. The odds are, she said, that any given individual will use, has used or uses an unlicensed device that became authorized under the new rules.

It could be the shiny new tablet or laptop you used to go online with coffee and Wi-Fi this morning. Or maybe it was the old cordless phone you dusted off to make a quick call. It could have been the baby monitor you used overnight or the remote control you pressed in the morning to get out of the garage.

The use of unlicensed spectrum is a part of everyday modern life, she essentially said, so better for the FCC to establish the parameters for those devices that are already operating in these bands.

The makers of the aforementioned unlicensed devices are surely pleased with the FCC move. But its action also opens another door for greater broadband connectivity.

## It's all about broadband

Even two years ago, it was recognized that the white space spectrum could offer cost-effective wireless broadband connectivity in rural areas and for machine-to-machine communications, according to a [Strategy Analytics report](#) at that time.

Indeed, there has been interest in this spot on the spectrum for a while, [from both companies](#) and the FCC, [which first approved its use](#) in 2008.

## Super Wi-Fi in the city

A recent test at [Rice University](#) shows that the white space spectrum can be used in urban areas as well. Carriers are all over city markets, of course, so broadband is not a problem. What the researchers are posing however, is something that may not be too much to carriers' liking: a super Wi-Fi network knitted together with next-generation TV or smart remotes.

In June engineers from the school [demonstrated that wireless data](#) could be transmitted over UHF channels during active TV broadcasts without interference.

The UHF spectrum, which ranges from 400 to 700 MHz, is superior to the higher-frequency signals used for existing Wi-Fi hotspots, the researchers said, as these signals carry for miles and are not blocked by walls or trees.

The technology that lead researcher Edward Knightly and Rice graduate student Xu Zhang developed is called "Wi-Fi in Active TV Channels," or WATCH. They received FCC approval to test it at the Rice campus in 2014, basing it on WARP, or "wireless open-access research platform."

The bottom line about WATCH: it requires no coordination with or changes to legacy TV transmitters, according to the researchers. It also solves a very practical problem. Most of the UHF band is already taken in U.S. cities, but still is largely underutilized.

Instead, according to their [paper](#):

TV signals are broadcast as normal and the WATCH system actively monitors whenever a nearby TV is tuned to a channel to avoid interfering with reception. The technology to allow this comes in two parts. One aspect of WATCH monitors TV broadcasts on a channel and uses sophisticated signal-canceling techniques to insert wireless data transmissions into the same channel; that eliminates TV broadcasts from interfering with the super Wi-Fi data signals being sent to computer users.

## "Perfectly suited for wireless data"

It should be noted that carriers such as [AT&T](#) and related associations such as the [National Association of Broadcasters](#) objected to the FCC rules in the run up to the commission's August meeting, citing concerns that new unlicensed uses in the 600 MHz band would create interference.

Another commissioner, Ajit Pai, acknowledged these concerns in his [own published comments](#), even though he did vote to approve the rules. He pointed to tests that showed even a 5% loss of spectrum capacity due to interference will lower spectrum values by 9%.

Little was said, however, about the competitive threat these rules might pose to mobile broadband providers.

As Knightly said, "The UHF band is perfectly suited for wireless data."

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*Erika Morphy has been writing about tech for more than twenty years.*

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