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More and more, white-space use is looking like a rural play

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It's been a while since we've heard of any white-space deployments or trials, but this week Rice University — in partnership with its wireless communications researchers and the nonprofit organization Technology for All, which works to bring technology to underserved communities — announced it will offer prototype in-home white-space hotspots to Houston locals and graduate students involved in putting the trial together.

To users, the new hotspot looks like any other. It can be accessed with any Wi-Fi device, but behind the scenes, the network uses "dynamic spectrum access" to automatically shift between traditional Wi-Fi frequencies and unused spectrum that exists between digital TV channels, in order to provide the best possible coverage.

Spectrum Bridge, which hopes to become a white-space database provider, is the other entity that has been testing the business case for point-to-point solutions in various markets. The company built out a network in Claudeville, Va., a small rural community lacking broadband connectivity, to show how white spaces can bridge the "digital divide." Two years ago, the city of Wilmington, Del., and the county of New Hanover, N.C., launched a white-space network using an experimental license to develop what Spectrum Bridge calls the nation's first smart-city network powered by the vendor's white space database. And last September, Google and Spectrum Bridge, together with the Hocking Valley Community Hospital, announced the deployment of the first white-space broadband network trial for healthcare providers in Logan, Ohio.

Interest in white space hit a fever pitch in 2008 when the FCC voted to move ahead with the conditional unlicensed use of such spectrum as another broadband alternative. But even though final approval from the FCC is in place, the business case for white-space use remains elusive, at least in larger markets.

Urban markets are problematic for white-space technology because geolocation data must be used to determine what frequencies are available for use, in order to prevent interference with other signals, namely TV broadcast signals. However, the heavy use of the spectrum in big markets such as Los Angeles and New York City means that very few channels will be available for use at any given time.

Moreover, the TV band is divided into 6 MHz-wide channels, which threaten to severely limit white-space data speeds. In comparison, 802.11n systems take advantage of 20 MHz to 40 MHz of spectrum and offer data speeds of about 65 Mbps.

Also, the vision of a super Wi-Fi network based on white-space technology in urban areas still needs to be standardized by the IEEE.

Finally, the FCC imposed strict out-of-band emission requirements, which means that Wi-Fi vendors cannot easily convert existing equipment and chips to work in white space spectrum, because additional filtering techniques will be required.

Add it all up and it looks as if white-space technology may be more suitable for rural markets. As recently reported, Carlson Wireless has developed RuralConnect IP, a software-defined white-space radio that delivers wireless broadband service to homes, businesses and municipal entities in rural and underserved areas. The company worked Spectrum Bridge and KTS Wireless — a wireless engineering firm headquartered in Lake

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Mary, Fla., that specializes in white-space technologies — to develop the radio. The company hopes to receive Federal Communications Commission certification for the device — which is targeted primarily to the wireless Internet service provider sector — in May.

The company has received an experimental license from the FCC to test the radio on lands occupied by the Yurok Tribe in the Klamath River region of Northern California. The tribe is the state's largest with about 5,000 members and its tribal lands cover roughly 63,000 acres of rugged terrain that is marked by a deep canyon that stretches for 25 miles and heavy foliage, conditions that render other broadband wireless technologies ineffective.

So, while white spaces may never become the super Wi-Fi networks in urban areas, folks like Carlson quickly are proving out the business case in rural areas. In addition to the habitants of such areas, public-safety entities looking to find connectivity in hard-to-reach areas also will be the beneficiaries.

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