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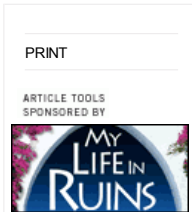
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Smart Grid Debate: Licensed vs. Unlicensed Wireless Spectrum

By

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A good portion of the intelligence that will be added to the upcoming smart grid will be wireless — radios, sensors and access points strategically placed throughout the power grid and on our homes that can help manage energy consumption and distribution. Increasingly, utilities and companies are deciding whether smart grid wireless networks need to run over licensed wireless spectrum, in which the airwaves are owned and regulated or

unlicensed, which is shared spectrum and can be used by anyone as long as they abide by certain rules. With utilities spending billions on smart grid networks, the choice could determine which tech companies that plan to sell smart grid gear to the utilities are successful and which are not.

The degree of reliability and security that a smart grid demands can only be achieved with licensed spectrum, its backers argue. The idea is that because licensed spectrum is owned by one entity and can be used for a single purpose its users won't face interference. But the problem is that licenses to buy spectrum cost money adding substantial fees to smart grid rollouts. On the other hand because unlicensed spectrum is shared and doesn't require an expensive license to access it, its backers believe it's the only option cheap enough to offer utilities a cost-effective method to roll out meter projects. But critics say that because unlicensed spectrum is shared by many users, services deployed on those networks can face interference.

We recently learned of the debate from Stewart Kantor, the CEO and founder of [Full Spectrum](#), a two-year-old startup that builds WiMAX-based wireless networking gear that runs over licensed spectrum. His company sells WiMAX-based radios (which add intelligence to the power grid where power is distributed from generation to substation) that run over licensed, ultra-high frequency and very high frequency spectrum. He told us [unlicensed wireless services are "problematic" for mission-critical services](#), which need to be secure, reliable and robust.

Kantor isn't the only one advocating a licensed spectrum smart grid. Ray Bell, the founder of Grid Net, a smart meter software startup, is also [betting on WiMAX \(at the meter level\)](#) and licensed spectrum. Bell pointed out that the municipal Wi-Fi companies, which unsuccessfully tried to build city-wide wireless networks based on unlicensed spectrum and Wi-Fi, realized very quickly how much interference exists



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for wide area networks built on unlicensed spectrum. "If I were a utility I would not bet on unlicensed spectrum for smart grid," Bell told us.

The CTO of meter technology maker [Sensus](#), Britton Sanderford, which builds smart meter services over licensed wireless spectrum, echoed Bell's thoughts. "We discovered years ago that there was a fair amount of interference [for unlicensed spectrum]," said Sanderford. Licensed spectrum is yours alone to ensure a "right of way," he said. "It's like having a private highway, compared to having to share traffic with other devices."

The Utilities Telecom Council, a trade group made up of utilities and grid vendors, has been [advocating for years that utilities "must have access](#) to dedicated radio spectrum." In the face of the attention on the smart grid buildout the UTC has increased its efforts to obtain dedicated spectrum for utilities calling for at least 30 MHz of spectrum. [In a report from January the UTC writes:](#)

Unfortunately, many highly critical utility control networks currently operate on radio frequency bands that must be considered suspect. Far too many have only secondary status on the 150-512 MHz bands allocated primarily for mobile voice systems. Many more operate on unlicensed spectrum, mostly in the 900 MHz band, sharing it with hundreds of millions of other devices from cordless phones to wireless internet service providers and RFID tags. These are not the best environments for such mission-critical networks.

But executives from the networking industry say that software and network management tools developed in the past few years can easily manage traffic over shared unlicensed wireless spectrum, and some utilities seem to agree. Silver Spring Networks, one of the better-known smart grid firms, uses unlicensed 900 MHz spectrum, and some licensed cellular networks for its smart grid deployments. Eric Dresselhuys, an exec in charge of markets at Silver Spring, tells us the 900 MHz unlicensed spectrum is the most cost effective. He also says there are a lot of questions surrounding ownership and recurring fees of licensed spectrum:

Does the user (utility) have unlimited access to use the frequency as needed? If not, what limitations or costs will future business needs have?...Will the user have to pay re-occurring license fees or upfront license fees? Smart Grid business cases face considerable cost pressures that must be considered over 10-, 15- or 20-year terms.

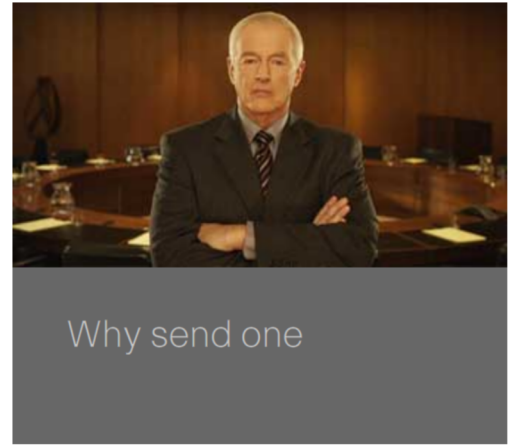
Several utilities now taking the lead with smart grid technology, [like PG&E and FPL](#), are partnering with Silver Spring.

Other utilities are considering a combo approach. Paul DeMartini, VP of advanced technology at utility Southern California Edison, said the decision about whether to use licensed or unlicensed "really depends on the business need" and he added that SCE anticipates that the smart grid could use both licensed and unlicensed spectrum. Ultimately I'm also thinking at this early stage in the game, with the smart grid at such a nascent stage, many utilities just aren't sure yet.

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