Wireless Microphones

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The vast majority of churches in America use wireless microphones. Most of them don't realize that, by doing so, they have been breaking the law. They also run the risk that those microphones will encounter significant interference in the future. What's a church to do?

Wireless microphones are illegal?

Wireless microphones are not illegal. Churches using them has been. Bizarre, I know.

No, this isn't a case of persecution, intentionally picking on churches. The reality is that, according to Federal Communications Commission (FCC) rules, "Part 74 devices" (wireless microphones) are only to be used under license by broadcasters. So, not only churches, but also theatrical companies, musical performers, and convention operators have been violating these regulations.

Why do these rules exist? Because these microphones operate in a frequency range licensed for television signals, they can interfere with the television broadcasts trying to use the same frequencies. Television stations have paid for the exclusive right to use these frequencies to operate their business. Since the FCC regulates spectrum use, the commission made it illegal for anyone to use a device which operates in those same frequencies except with the explicit permission of the broadcasters.

Practically speaking, this has never been an issue. Users of wireless microphones simply chose a frequency band corresponding to a television channel not used in their local area. So, for all the years that wireless microphones have

been used, nobody's really been overly concerned, and I'm not aware of any wireless mic users being charged with breaking this law.
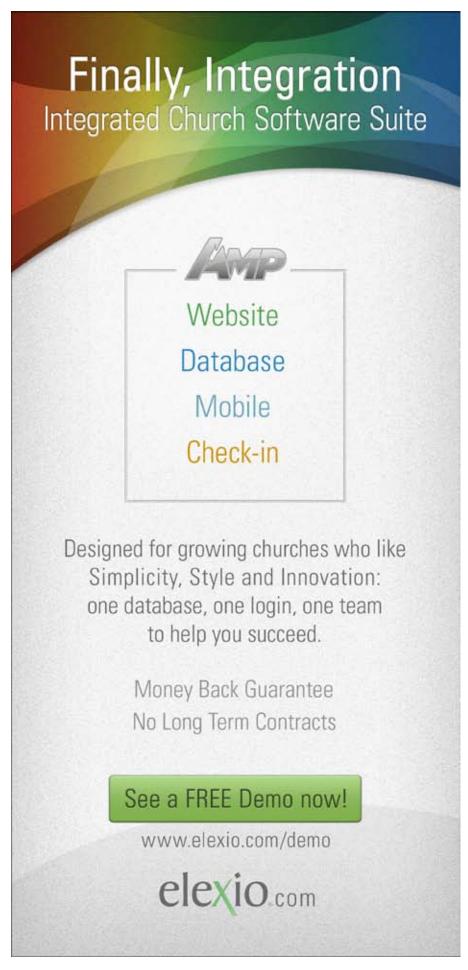
Are wireless microphones valuable to churches?

I'm guessing I don't really need to answer this question. If you've read this far and started wondering how you will ever survive without wireless mics, you've probably already thought through how much you rely on these devices and how painful it would be to go back to the old days of wired microphones.

Wireless mics significantly simplify the set up process for worship, preaching, and events. Using them can easily save hours of work per month. Wireless microphones also provide flexibility and freedom to preachers and worship leaders. They no longer feel like they are on a leash, constrained in what they can do and where they can do it. I have seen pastors spontaneously come down off the chancel and into the congregation in ways that would never work with a wired mic.

Why is this an issue now?

In September of 2010, the FCC approved the use of vacated television spectrum for "white space" unlicensed applications, such as "Super Wi-Fi." In January of this year, the first of these "white space" networks launched in Wilmington, North Carolina. This is the event that creates real, meaningful potential for interference between "illegal" wireless microphones and "legal" uses of the same frequency bands.

In February of this year, Congress passed a bill that will lead to even more "white space" band-

width becoming available for unlicensed use. It will take months or years for the FCC to put in place the rules for this use, but eventually it will further challenge the use of wireless microphones.

Once "white space" devices are in use (as they are beginning to be used in Wilmington), they run the risk of interfering with wireless microphones. For example, if someone in your congregation has a mobile Internet device in his pocket and it is using the same frequencies as your microphones, then you may experience signal drop outs or noise in your audio channels.

What is "white space?"

According to Wikipedia: "In telecommunications, white spaces refer to frequencies allocated to a broadcasting service but not used locally. National and international bodies assign different frequencies for specific uses, and in most cases license the rights to broadcast over these frequencies. This frequency allocation process creates a bandplan, which for technical reasons assigns white space between used radio bands or channels to avoid interference. In this case, while the frequencies are unused, they have been specifically assigned for a purpose, such as a guard band. Most commonly however, these white spaces exist naturally between used channels, since assigning nearby transmissions to immediately adjacent channels will cause destructive interference to both. In addi-

tion to white space assigned for technical reasons, there is also unused radio spectrum which has either never been used, or is becoming free as a result of technical changes. In particular, the switchover to digital television frees up large areas between about 50 MHz and 700 MHz. This is because digital transmissions can be packed into adjacent channels, while analog ones cannot. This means that the band can be "compressed" into fewer channels, while still allowing for more transmissions. "

In 2007, a coalition of large technology companies, including Google, Microsoft, and Intel, came together to lobby the FCC to provide unlicensed use of the newly freed white space spectrum for broadband wireless Internet services. They created prototype white space devices to demonstrate that the technology could work without disrupting television signals. The coalition faced significant resistance from groups including broadcasters, wireless microphone makers, and groups that use wireless mics. However, based on successful tests, the FCC approved white space devices in November 2008. It is expected that a variety of types of devices will use white space technology for Internet access.

What can we do?

When the FCC authorized the use of "white space" frequencies, the commission put in place two mechanisms to protect wireless microphones.

First, the FCC has reserved two channels in each city for use by wireless microphones. Second, the commission has established a geo-location database. The database provides the information on reserved channels, but more importantly wireless mic users can register when and where they will be using which channel. White space devices have to dynamically check the database and aren't allowed to interfere with that channel at that time near that location. The initial database is available at http://whitespaces.spectrumbridge.com/Main.aspx. (Note that unlicensed wireless mic users, like churches must first get approval from the FCC before being listed in the database.)

The good news is that by putting these accommodations in place, the FCC is effectively approving the use of wireless microphones by all. Hallelujah, we are no longer law breakers! Of course, for those of us in Christ, we have an even greater reason to rejoice! "There is therefore now no condemnation for those who are in Christ Jesus." (Romans 8:1 ESV)

Russ McGuire is an executive for a Fortune 100 company and the founder/co-founder of three technology start-ups. His latest entrepreneurial venture is Hschooler.net (http://hschooler.net), a social network for Christian families (especially homeschoolers) which is being built and run by eight homeschooled students under Russ' direction.