



Radio spectrum: surging demand drives the need to understand regulation

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The pace of innovation for wireless products and services over the past decade or so has been breathtaking. Since the introduction of the iPhone – less than 10 years ago – near-ubiquitous mobile networks have developed to provide instant broadband access to the Internet for streaming news, sports, and entertainment.

But the ability to stay in constant contact with friends or check the latest sports scores from just about anywhere is only one part of the wireless revolution. A vast number of applications and services have developed that use wireless technologies to make us smarter, more efficient, safer and healthier. Medical implant devices now monitor and regulate internal organ activity; some, using wireless technology, immediately notify doctors of critical health changes. Smart sensors and switches execute real-time network adjustments to address unusual demands on power grids and help avoid outages. Collision-avoidance radar technologies help direct vehicles both on the ground and in the air to steer clear of hazards. Crowdsourcing applications warn us of traffic congestion and provide dynamic route adjustments to help save fuel and lower stress.

A natural resource

Enabling each of these applications is radio spectrum, the precious natural resource that serves as the invisible conduit for the transmission of data in many varied forms. The value of spectrum is quantifiable – in 2015, the US

Federal Communications Commission completed an auction of spectrum licenses suitable for providing wireless broadband services and received more than \$41 billion in net bids. One year later, the FCC is now in the process of auctioning additional licenses that will likely raise an additional \$30 - \$35 billion for the US Treasury.

While auction-generated revenue is no doubt impressive, there are other less tangible benefits of spectrum use. First responders rely on private two-way radio networks to help save lives and protect property. Air traffic control services rely on radio frequencies to manage air traffic and ensure safe skies. The Wi-Fi and non-licensed spectrum ecosystem, which relies on shared spectrum that is not auctioned, is estimated to have contributed \$222 billion to the US economy.* These and other less visible radio-based services are ever-present factors influencing nearly every aspect of our daily lives.

A critical government function

The once arcane world of spectrum management has developed into a critical government function. And we have likely seen only the tip of the iceberg. By 2020, the Internet of Things (IoT), which promises a world in which every household device has wireless communications capabilities, will likely increase network traffic six-fold through the anticipated introduction of some 50 billion wireless devices. This surge will not only require that more spectrum be made available, but also will demand that we be smarter about how spectrum is deployed and shared by competing users. Indeed, government decision makers are looking towards more sharing of the spectrum resource, rather than granting any user exclusive use for any particular system.

Competing for spectrum

Developers of new spectrum-based technologies must aggressively compete for spectrum with other new technologies as well as with traditional telecom companies. Autonomous cars will require spectrum for control and two-way data communications; but other parties want to share such cars' proposed spectrum home for other uses. Medical devices are becoming more and more reliant on the use of the spectrum; but they will need to ensure their transmissions are reliable, secure and protective of the sensitive information involved. Unmanned aircraft systems (drones) need spectrum to control their flights and deliver data to the ground; but resolving spectrum usage will entail a lengthy regulatory process.

As demand continues to grow, all companies will need to become cognizant of the regulatory processes affecting the allocation and use of spectrum and will need to understand the sometimes arcane legal, technical, and policy decisions about spectrum that could directly affect their businesses.

Find out more about the regulatory processes around radio spectrum by contacting any of the authors.

* See *this page*.

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