A Better Way To License

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The FCC made history this fall when it authorized point-to-point operation at 71-76, 81-86, and 92-95 GHz &#151 but not because these are the highest frequencies ever allocated for commercial use, or even because it is the biggest chunk of spectrum FCC has ever made available at one time. The real news went almost unnoticed: a startling new licensing scheme that may revolutionize radio operations across the spectrum. Today it takes weeks to coordinate and license a site-specific radio facility. The new rules will do the same thing in a minute or two, bringing to high-powered fixed service operations the same key benefits now available only in the low-power unlicensed domain: speed of installation, low administrative costs, and quick response to customers' changing needs. Yet it will preserve the overriding advantage of licensing: protection from interference by other users.

The cost and delay &#151 especially the delay &#151 of FCC licensing has been an obstacle to rapid deployment since the earliest days of radio. Indeed, getting the license has often been the slowest part of setting up a new facility. Yet the licensing process is important: in most services it accomplishes the key function of keeping stations far enough to prevent serious interference. The FCC's biggest headache in radio has always been finding ways to accomplish that fairly and efficiently.

Licensing Evolves

The FCC's earliest licensing efforts necessarily focused on AM broadcasting and ship communications, those being the only forms of radio in existence when the FCC opened its doors in 1935. Licensing was reasonably quick in the early years, until a 1945 U.S. Supreme Court required a hearing whenever the FCC chose between mutually exclusive applications. Because an AM station covers tens or hundreds of thousands of square miles, many applications were mutually exclusive. The purpose of the hearing was to determine which applicant would better &quotserve the public interest&quot&#151 a notoriously vague standard. Over time the FCC established supposedly objective criteria, but that just helped the lawyers prolong the proceedings. Before the system was finally abolished in the 1990s, a contested broadcast application typically went through a trial-type hearing before a hearing examiner, followed by four separate layers of appeals &#151 any of which could send the whole case back to begin anew. Application proceedings routinely took five years, sometimes ten years and longer. As FM and then TV station licenses grew increasingly valuable, the litigation became more intense. Often the license went not to the best qualified applicant, but to the party best able to keep paying its legal bills. It was a golden age for communications lawyers in the generation before mine.

By the 1950s the FCC was increasingly licensing microwave links and two-way mobile systems. Equipment was still expensive, and spectrum still plentiful, so mutually exclusive applications could be avoided. And even when applications began to outrun the available frequencies, the FCC managed to avoid hearings by requiring that applications be &quotfrequency coordinated&quot prior to filing. By refusing even to accept an application until the applicant had identified a non-interfering frequency at the applied-for location, the FCC was able to avoid mutually exclusive applications altogether.

But frequency coordination had its own disadvantages. The process of locating an open frequency, and then asking incumbent licensees nearby to agree to its use, took weeks. Point-to-point facilities in congested areas often needed several such tries to find an available route. And once frequency coordination was complete, the FCC still needed weeks more to issue the license. Many customers with fast-changing needs simply passed over radio communications altogether and dealt with the telephone company instead.

The advent of area-wide licenses for cellular telephone service in the late 1970s raised new challenges. Frequency coordination would not work, and the &quotpublic interest&quot standard made little sense. Congress solved the problem in 1981 by allowing the FCC to choose licensees by lottery. Predictably, vast number of speculators applied for licenses in hopes of reselling them to the highest bidder. Again Congress stepped in, and in 1993 eliminated the middleman by letting the FCC itself auction off spectrum.

Concurrent with these changes in licensing, the FCC moved aggressively to liberalize unlicensed operations. With the authorization of spread spectrum in 1985, unlicensed devices became more powerful, sophisticated and widespread, and soon afterward their prices dropped sharply. We see the result today in the ubiquity of inexpensive Wi-Fi. Yet the rules for unlicensed operation seem anarchic. A user may transmit anywhere, any time, subject only to technical compliance (and avoiding interference to licensed services). Worse, a user must accept interference from any source, licensed or not. Despite these constraints, clever engineering nevertheless has yielded multiple families of unlicensed devices that operate with surprising reliability, even under highly congested conditions.

Today most newly allocated spectrum is earmarked for auction by geographic area, or else is set aside for unlicensed use. Sometimes called "market based" and &quottechnology based,&quot respectively, these two approaches have promoted a long-running ideological debate. Fans of auctioned spectrum, citing PCS as their lead example, see market forces as the best way to promote efficient use, and argue that free spectrum merely rewards inefficiency. Supporters of unlicensed operation favor the free-speech benefits of communicating without gatekeepers, and point to the ever-evolving Wi-Fi standards as evidence of vigorous technological competition.

Finding a Better Approach

A licensing scheme can be judged on five criteria: interference prevention, cost, speed, fairness, and efficiency of spectrum use. No approach tried so far scores well on more than three of these, perhaps four at most. But the new allocations at 71-76, 81-86, and 92-95 GHz have prompted the FCC to try a new method that will ultimately have important consequences across the spectrum.

In the services that use frequency coordination, the completion of a successful coordination has always been a prerequisite to the license application. The FCC's new approach reverses the sequence. First, the applicant obtains a license. That is done electronically in just a few minutes. All licenses automatically cover all frequencies at 71-76, 81-86, and 92-95 GHz, everywhere in the nation. Then, license in hand, the applicant undertakes frequency coordination. But instead of sending the link data to a commercial coordinator and waiting for weeks, the applicant simply logs onto a website and types in the locations and frequencies (and a credit card number). The software checks the proposed link against the database of incumbents, and immediately clears the new link for use or else reports it will cause interference. If the link passes, the software adds it to the database for future coordinations. (In practice applicants may have to run through a separate database for federal government links.)

This is the first licensing process that meets all criteria simultaneously. The FCC is wise to try it first at very high frequencies, where tightly focused beams and relatively short range make system behavior predictable. Nonetheless, even before the rules implementing the new scheme have taken effect, some at the FCC are informally discussing extensions of the same plan to other licensing situations father down the spectrum. If successful, this approach will finally accomplish the ultimate objective of radio regulation: fully protected, licensed service as fast and easy as a Wi-Fi installation. That can only be good for the industry.

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