Wireless Spectrum for Dummies

TO LEARN MORE, GO TO
www.ecompany.com
AND TYPE IN
Spectrum

THE ELECTROMAGNETIC SPECTRUM HAS been around for as long as the universe, but from all the attention heaped on it recently, you'd think it had just surfaced yesterday. New digital and wireless technologies—from cell phones to satellites to high-definition television—are dramatically changing how we use the airwaves and presenting enormous new business opportunities. The U.S. government and the Federal Communications Commission have responded by reallocating huge swaths of spectrum for new uses and auctioning slices to the highest bidders for prices expected to reach well into the billions. The future of many giant communications companies rests on the outcome of those auctions. It's tricky business and complex science. Here's a primer.

Major Commercial Wireless Services*

Broadcast TV
Channels 2-4 (VHF) **54 to 72 MHz**
Channels 5-6 (VHF) **76 to 88 MHz**
Channels 7-13 (VHF) **174 to 216 MHz**
Channels 14-20 (UHF) **470 to 512 MHz**
Channels 21-36 (UHF) **512 to 608 MHz**
Channels 38-69 (UHF) **614 to 806 MHz**
See also 3G Broadband Wireless below

3G Broadband Wireless
746 to 764 MHz; 776 to 794 MHz
To be used for "third-generation" advanced wireless services. Now houses TV channels 60-69 but is scheduled for auction in March 2001. 3G services may not launch for years, though, because broadcasters don't have to leave the band until 2006 at the earliest.

3G Broadband Wireless (proposed)
1,710 to 1,855 MHz
2,500 to 2,690 MHz
The Clinton administration has proposed auctioning this spectrum for 3G broadband wireless services.

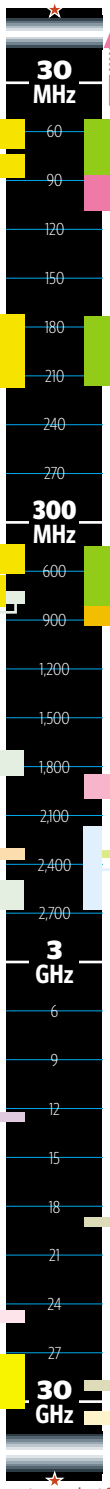
Wireless Communications Service (WCS)
2,305 to 2,320 MHz; 2,345 to 2,360 MHz
Intended for wireless data services; proximity to the satellite radio band could make it a good addition to digital radio services in the future.

Direct Broadcast Satellite (DBS)
12.2 to 12.7 GHz
EchoStar and DirecTV now dominate this fast-growing business, offering hundreds of TV channels via satellite. They have become major competitors to cable TV companies. Both DBS firms are adding interactivity using wire-line and satellite back channels.

Digital Electronic Message Service (DEMS)
24.25 to 24.45 GHz; 25.05 to 25.25 GHz
This high-capacity allocation carries a lot of data but the signal can't travel far. Teligent owns most of the licenses and offers broadband data services to businesses in dense, urban areas.

Local Multipoint Distribution Service (LMDS)
27.5 to 29.5 GHz; 31.0 to 31.3 GHz
XO Communications (the merger of NextLink and Concentric), a venture founded by Craig McCaw, dominates this band, with 95 percent coverage in the top 30 markets. Winstar also holds some licenses here. Both are building fixed wireless systems.

*This diagram shows only a select number of U.S. commercial services. Not represented are hundreds of more minor commercial and noncommercial services. The government is the single largest user of U.S. airwaves. It runs services ranging from law enforcement radio to satellite space research and top-secret military communications.



★ The radio spectrum starts at 3 KHz

The radio spectrum ends at 300 GHz

AM/FM Radio
535 to 1,605 KHz
88 to 108 MHz

Digital TV
54 to 88 MHz
174 to 216 MHz
470 to 806 MHz
Broadcasters have started transmitting digital signals, but rollout is slow due to sluggish sales of digital TV sets and reluctance by cable operators to carry HDTV. By 2006, all broadcasters are expected to switch over to digital TV, although that deadline may not hold. Broadcasters' analog spectrum will be reauctioned for new wireless services.

Cellular Phone Service
806 to 902 MHz
Waning in popularity as PCS takes off.

Personal Communications Service (PCS)
1,850 to 1,990 MHz
This band is used for digital cellular phone service. Considered a 2G (second-generation) cellular service. Dominated by big carriers such as AT&T, Cingular Wireless (a joint venture of SBC and BellSouth), and Sprint.

Satellite-Delivered Digital Radio
2,320 to 2,325 MHz
Sirius Satellite Radio and XM Satellite Radio paid a combined $173.2 million for licenses in 1997. They plan to launch services in spring 2001.

Multichannel Multipoint Distribution Service (MMDS)
2,150 to 2,680 MHz
Sprint and WorldCom bought several of the failing "wireless cable" companies with MMDS spectrum and are converting them from TV service to two-way digital data services.

Teledesic
18.8 to 19.3 GHz
28.6 to 29.1 GHz
Teledesic, the two-way digital satellite service scheduled for full deployment by 2005, plans to use the 18-GHz band for downstream transmissions and the 28-GHz band for upstream. Teledesic's investors include wireless pioneer Craig McCaw, Bill Gates, and Saudi prince Al-Waleed bin Talal.

39 GHz Fixed Wireless Service
38.6 GHz to 40 GHz
Winstar was the top bidder at the May auction of this spectrum, paying $161 million for 931 licenses. It plans to offer fixed wireless services in combination with its LMDS capacity at 28 GHz.

WORLD PERSPECTIVES/TONY STONE IMAGES: EXPLANATION GRAPHIC BY NIGEL HOLMES