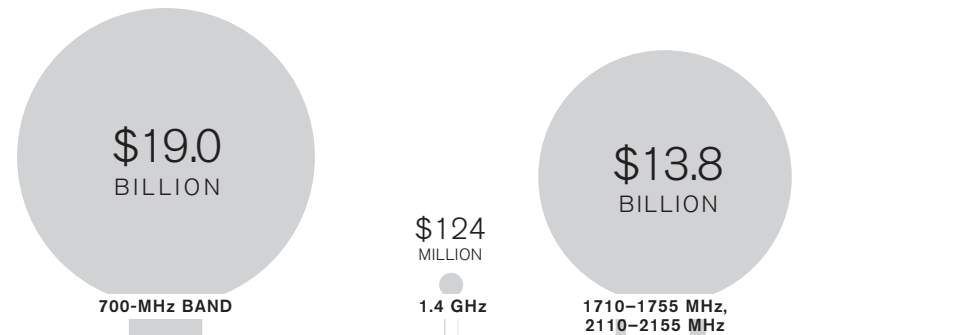
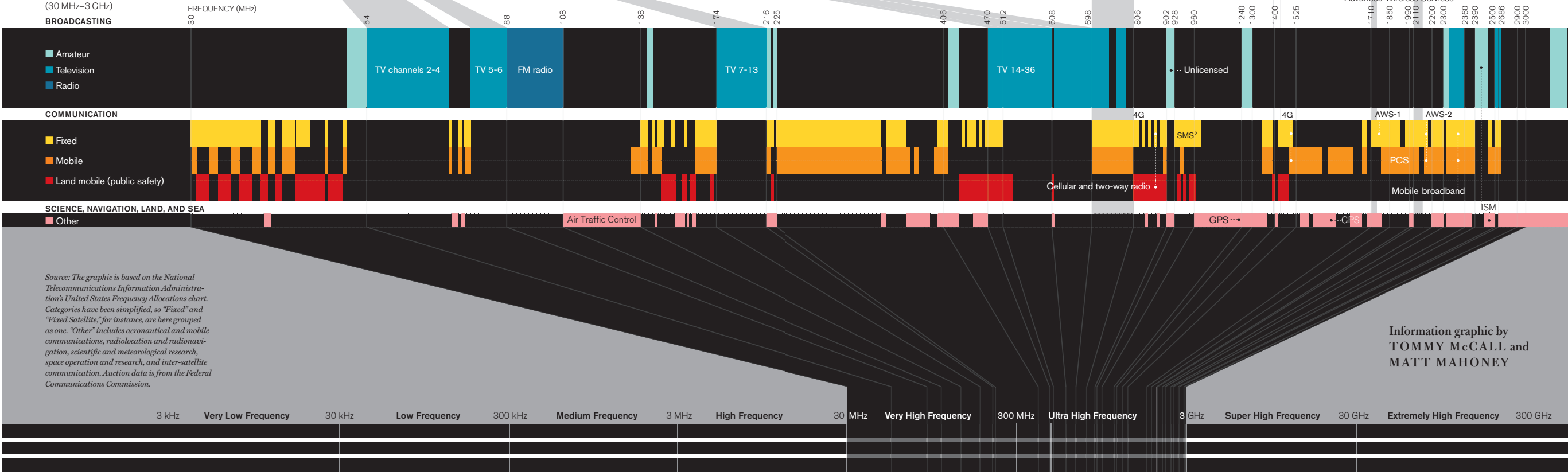


**OPENING UP "WHITE SPACES"**  
 Even before the switch to digital TV, broadcasters were using less and less of the bands that they had been granted decades ago. These frequencies are especially valuable because they can be used to transmit information over long distances.

**KEY RECENT AUCTIONS OF SPECTRUM**  
 With spectrum scarce, U.S. telecom companies have spent billions on licenses to use it. In 2008, Verizon snapped up large portions of the 700-megahertz band to build up its 4G LTE network; two years earlier, T-Mobile won enough spectrum near two gigahertz to build its 3G network.



**U.S. RADIO FREQUENCY ALLOCATIONS**  
 (30 MHz–3 GHz)



*Source: The graphic is based on the National Telecommunications Information Administration's United States Frequency Allocations chart. Categories have been simplified, so "Fixed" and "Fixed Satellite," for instance, are here grouped as one. "Other" includes aeronautical and mobile communications, radiolocation and radionavigation, scientific and meteorological research, space operation and research, and inter-satellite communication. Auction data is from the Federal Communications Commission.*

Information graphic by  
**TOMMY McCALL** and  
**MATT MAHONEY**

**Spectrum of Issues**

Increased demand for wireless bandwidth is forcing regulators to get creative.

The radio frequency spectrum, which once seemed to offer virtually unlimited capacity for communication, has become crowded as smart phones and other wireless devices increasingly gobble up bandwidth. One obvious solution has been to let the private sector buy access

to underused slices of the spectrum previously reserved for government. In the United States, auctions for those licenses have been going on since 1994; in recent years, these multibillion-dollar spectrum auctions have allowed telecommunications companies such as AT&T, Verizon,

Sprint, and T-Mobile to improve 3G networks and build their faster next-generation networks. But in September, the Federal Communications Commission gave its final approval to a potentially more revolutionary policy. It allows certain wireless networks to provide broad-

band services over the so-called "white spaces," unused areas between stations in the TV broadcast spectrum. Vastly more white spaces are available now that TV broadcasters have switched from analog to digital transmissions. The exact details of how wireless devices will know if a

channel is unoccupied and available for broadcast in a particular area are still being finalized. But if the experiment works and more wireless devices can peacefully share the public airwaves, it could lead to a much more efficient and flexible use of the entire spectrum. **tr**