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# By the Numbers… Spectrum Explained

Spectrum (spek'trəm) is the radio frequencies that are designated for specific uses, such as cellphones, smartphones, tablets and public safety. Quite simply, spectrum "fuels" the wireless industry so we can use our devices anytime, anywhere and for anything, including applications and services for other sectors such as education, healthcare, transportation and energy.

Consumers consume a lot of wireless data today:

- Wireless data traffic **increased 104%** from 568 billion megabytes as of midyear 2011 to **1.159 trillion megabytes** in the last 12 months.[1]
- The amount of data the average smartphone user consumes per month has **grown by 89%** from 230 MB in Q1 2010 to **435 MB** in Q1 2011.[2]

But it's the projected astronomical consumer usage that means more spectrum is urgently needed.

By 2016:[3]

- Monthly global mobile data traffic will surpass **10 exabytes** in 2016.
- Over **100 million** smartphone users will belong to the "gigabyte club" (over 1GB per month) by 2012.
- The number of mobile-connected devices **will exceed the world's population** in 2012.
- Due to increased usage on smart-phones, handsets **will exceed 50 percent** of mobile data traffic in 2014.
- Monthly mobile tablet traffic will surpass **1 exabyte** per month in 2016.
- Tablets will exceed **10 percent** of global mobile data traffic in 2016.

To help the wireless industry meet this demand, the FCC's National Broadband Plan (NBP) identified 500 MHz of spectrum to be made commercially available by 2020.[4] This goal was also endorsed by President Obama.[5]

While the Middle Class Tax Relief and Job Creation Act[6] will make a substantial down payment toward the NBP target, more spectrum is needed.

Government spectrum is important to meet this demand. The recent PCAST report focuses more on spectrum sharing and less on spectrum clearing. While certain types of sharing are possible, this unproven and speculative method would be a radical departure from the bipartisan approach that has been supported for the last three decades.

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# By the Numbers… Spectrum and Economy

The most recent spectrum auctions, 700 MHz and AWS, raised **~$30 billion** for the U.S. Treasury.

Historically, data shows that for every 10 MHz of licensed spectrum:[7]

- US GDP increases by **$1.739 billion**
- U.S. employment increases by at least **7,000**
- Government revenues increase by **$468 million**
- Wireless service provider revenues increase by **$1.924 billion**
- Wireless device revenues increase by **$439 million**
- Wireless applications and content sales increase by **$263 million**

| | 2004 | 2011 | Difference | Impact of 10 MHz incremental spectrum |
|---|---|---|---|---|
| **Spectrum** | 196.5 MHz | 508 MHz | 311.5 MHz | |
| **GDP (per year)** | $92 billion | $146.2 billion | $54.2 billion | $1.739 billion |
| **Total Wireless Employment** | 3.6 million | 3.8 million | 219,730 | 7,053 |
| **Combined Federal, State, Local and Sales Taxes** | $15.5 billion | $30.1 billion | $14.6 billion | $468 million |
| **Wireless Service** | $104.4 billion | $164.5 billion | $60.5 billion | $1.924 billion |
| **Wireless Devices** | $12.4 billion | $26.1 billion | $13.7 billion | $439 million |
| **Application and Content** | $0.5 billion | $8.7 billion | $8.2 billion | $263 million |

Source: Ovum, Recon Analytics 2012

The economic impact of bringing 500 MHz of spectrum, per the FCC's National Broadband Plan, to market by 2020 is **$166 billion** increase in U.S. GDP; at least **350,000** new U.S. jobs; an additional **$23.4 billion** in government revenues; and **$13.1 billion** increase in wireless applications and content sales.[8]

Continued 4G wireless network investments could mean investments of **$25 billion to $53 billion**, bring **$73 billion to $151 billion** in GDP growth and provide **371,000 to 771,000 jobs** by 2016.[9]

In 2011, U.S. providers reported making capital investments totaling **$25.3 billion.** Wireless providers in 15 European countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the UK) spent **$18.6 billion** combined.[10]

**1.** Robert Roche and Liz Dale, CTIA's Wireless Industry Indices: Semi-Annual Data Survey Results, A Comprehensive Report from CTIA Analyzing the U.S. Wireless Industry, Midyear 2012 Results, released November 2012. **2.** Nielsen Wire, "Average Smartphone Data Usage Up 89% as Cost per MB Goes Down 46%," June 17, 2011, available at http://blog.nielsen.com/nielsenwire/online_mobile/average-u-s-smartphone-data-usage-up-89-as-cost-per-mb-goes-down-46/ (last visited Sept. 10, 2012). **3.** Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2011-2016, Feb. 14, 2012, available at http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.html (last visited Sept. 10, 2012). **4.** FCC, National Broadband Plan: Connecting America, available at http://www.broadband.gov/plan/ (last visited Sept. 10, 2012). **5.** Barack H. Obama, Presidential Memorandum: Unleashing the Wireless Broadband Revolution, June 28, 2010, available at http://www.whitehouse.gov/the-press-office/presidential-memorandum-unleashing-wireless-broadband-revolution (last visited Sept. 10, 2012). **6.** Middle Class Tax Relief and Job Creation Act of 2012, (Public Law 112-96, Feb. 22, 2012), available at http://www.gpo.gov/fdsys/pkg/PLAW-112publ96/pdf/PLAW-112publ96.pdf (last visited Sept. 10, 2012). **7.** Roger Entner, Recon Analytics, The Wireless Industry: The Essential Engine of US Economic Growth, 2012, available at http://reconanalytics.com/wp-content/uploads/2012/04/Wireless-The-Ubiquitous-Engine-by-Recon-Analytics-1.pdf (last visited Sept. 10, 2012). **8.** Id. **9.** Deloitte, The Impact of 4G Technology on Commercial Interactions, Economic Growth and U.S. Competitiveness, 2012, available at http://www.deloitte.com/us/impactof4g (last visited May 16, 2012). **10.** Robert Roche and Liz Dale, CTIA's Wireless Industry Indices: Semi-Annual Data Survey Results, A Comprehensive Report from CTIA Analyzing the U.S. Wireless Industry, Year-End 2011 Results, May 2012; Emmet Kelly, et al., European Telecoms Matrix Q1 2012, Bank of America Merrill Lynch, (March 30, 2012).

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